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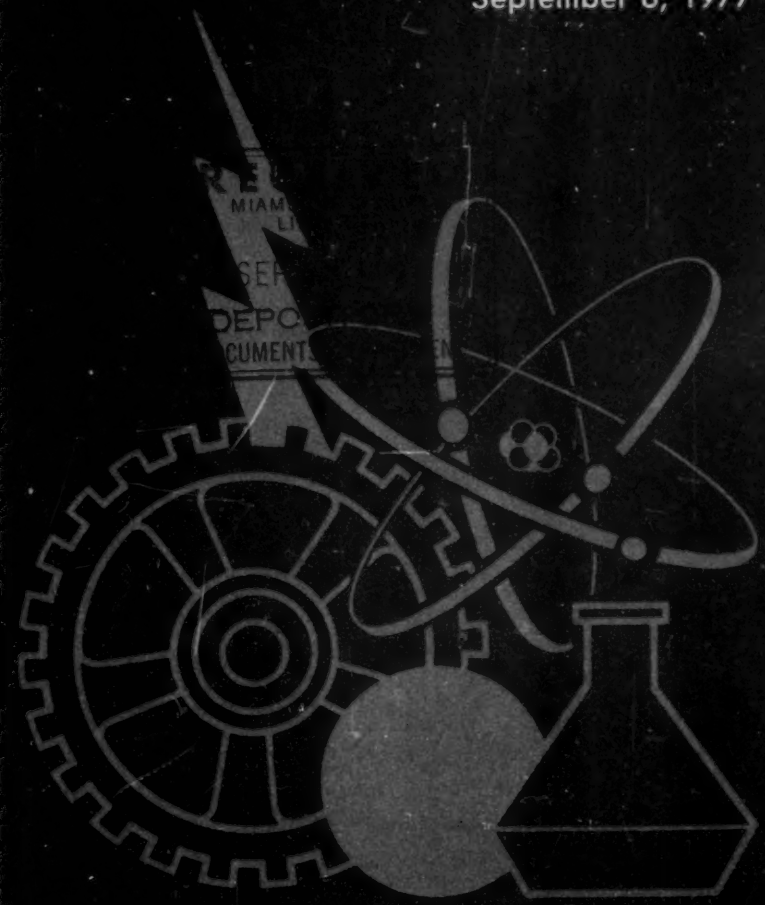
UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

September 6, 1977



U.S.
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September 6, 1977 Volume 962 Number 1

CONTENTS

	Page
Patent and Trademark Notices	
Order	962 OG 2
Right of Priority (35 U.S.C. 119) Based on a Foreign Application Filed Under a Bilateral or Multilateral Treaty	962 OG 2
Government Publications Subscription Service	962 OG 2
Trademark Applications Under Section 44 of the Trademark Act of 1946	962 OG 2
May-July 1977 Classification Orders	962 OG 4
Patent Suits	962 OG 4
Reissue Applications Filed	962 OG 5
Patent Notices	
Certificates of Correction for the Week of September 6, 1977	962 OG 6
Disclaimers	962 OG 6
Dedications	962 OG 6
Disclaimer and Dedication	962 OG 6
Condition of Patent Applications	962 OG 7
Defensive Publications (T962,001)	1
Reissue Patents Granted (29,382)	5
Plant Patents Granted (4,097)	9
Patents Granted	
General and Mechanical (4,045,824)	11
Chemical (4,046,501)	241
Electrical (4,046,957)	363
Design Patents Granted (245,646)	461
Index of Patentees	PI 1
Indices of Applicants of Defensive Publications, Reissues, Plants and Designs	PI 48
Classification of	
Patents (Including Reissues)	PI 51
Designs, Plants and Defensive Publications	PI 54
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 55
Designs, Plants and Applicants of Defensive Publications	PI 57
Change of Address Form and Subscription Order Form	Back Page

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PATENT AND TRADEMARK OFFICE NOTICES

Order

Oswald H. Milmore of Mariposa, California, whose registration number is 13,989, is hereby suspended for a one-year period beginning July 15, 1977, from practice as a Patent Agent in applications before the United States Patent and Trademark Office, without prejudice to his registration upon a sufficient showing after a period of not less than one year.

This action is taken under the provisions of Section 32 of Title 35, U.S. Code, and Section 1.348, Title 37, of the Code of Federal Regulations.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

June 22, 1977.

Right of Priority (35 U.S.C. 119) Based on a Foreign Application Filed Under a Bilateral or Multilateral Treaty

Under Article 4A of the Paris Convention for the Protection of Industrial Property (21 UST 1583; 24 UST 2140; TIAS 6923, 7727; 852 O.G. 511) a right of priority may be based either on an application filed under the national law of a foreign country adhering to the Convention or on a foreign application filed under a bilateral or multilateral treaty concluded between two or more such countries. Examples of such treaties are the Hague Agreement Concerning the International Deposit of Industrial Designs, the Benelux Designs Convention, and the Libreville Agreement of September 13, 1962, relating to the creation of an African and Malagasy Industrial Property Office. The Convention on the Grant of European Patents and the Patent Cooperation Treaty will be further examples of such treaties once they enter into force.

The Priority Claim

In claiming priority of a foreign application previously filed under such a treaty, certain information must be supplied to the Patent and Trademark Office. In addition to the application number and the date of the filing of the application, the following information is required: (1) the name of the treaty under which the application was filed, (2) the name of at least one country other than the United States in which the application has the effect of, or is equivalent to, a regular national application, and (3) the name and location of the national or intergovernmental authority which received such application.

Certification of the Priority Papers

Section 119 of Title 35 of the United States Code requires the applicant to furnish a certified copy of priority papers. Certification by the authority empowered under a bilateral or multilateral treaty to receive applications which give rise to a right of priority under Article 4A(2) of the Paris Convention will be deemed to satisfy the certification requirement.

Aug. 9, 1977.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Government Publications Subscription Service

The purpose of this notice is to inform subscribers of Federal Government publications serviced by the Government Printing Office, Superintendent of Documents, of the requirement to standardize subscriber change of address procedures.

It is imperative that the Government Printing Office be advised by each subscriber of an address change and that such advisement be accompanied by the latest subscription address label.

The Government Printing Office has the largest number of subscriptions of any activity in the United States. The Superintendent of Documents maintains about 835 mailing lists containing nearly 3 million addresses. Many of these subscribers frequently change their addresses and inform the Superintendent of Documents in a wide variety of methods. Some large organizations have as many as 20 identical subscriptions to the same street address but with different internal deliveries. Altogether the Government Printing Office is mailing nearly 5 million subscription copies each month. The Government Printing Office requests your cooperation to more effectively maintain the many mailing lists.

For your convenience, a change of address form is reproduced on the last page of the OFFICIAL GAZETTE.

BRADFORD R. HUTHER,
Acting Assistant Commissioner for Administration.

Aug. 9, 1977.

Trademark Applications Under Section 44 of The Trademark Act of 1946

[37 CFR Parts 2 and 4]

Proposed Rulemaking

AGENCY: Patent and Trademark Office, Commerce:

ACTION: Proposed rulemaking.

SUMMARY: This notice invites written comment on a Patent and Trademark Office proposal to amend the rules of practice and forms for trademark cases filed under section 44 of the Trademark Act of 1946. The proposed changes are being made because of the decision by the Court of Appeals for the District of Columbia Circuit in *SMC Corporation* v. *Langis Foods Ltd.*, 539 F. 2d 196, 190 USPQ 288 (1976). The effect of the proposed amendments is to eliminate the requirement for an allegation of use of the mark and the submission of specimens showing use of the mark in the case of applications for trademark registration which are based on a foreign application or registration. The proposed changes would require the applicant to submit a certified copy of his foreign application if he is claiming a right of priority based on that foreign application. Furthermore, the identification of goods and services may only include goods or services on which the applicant is using the mark, or has a bona fide intention to use the mark.

DATES: Comment must be received on or before November 1, 1977. Requests to speak at the hearing by October 17, 1977. Hearing date October 26, 1977. 9:30 a.m., e.d.t.

ADDRESSES: Comments may be addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231. All comments received will be available for public inspection in Room 11E10, Crystal Plaza, Building 3, 2021 Jefferson Davis Highway, Arlington, Va.

HEARING LOCATION: Room 11C24, Crystal Plaza, Building 3, 2021 Jefferson Davis Highway, Arlington, Va. 22202.

FOR FURTHER INFORMATION CONTACT: C. Morten Wendt, Patent and Trademark Office (703-557-3268).

SUPPLEMENTARY INFORMATION: On April 30, 1974, at 921 O.G. TM 250, notice was published that trademark applications filed under section 44 of the Act of 1946 without specimens and without a statement of use would receive a filing date conditional upon the ultimate decision in the civil action which was brought to review the decision of the Trademark Trial and Appeal Board in *John Lecroy & Son, Inc.* v. *Langis Foods Limited*, 177 USPQ 717 (1973).

The civil action was finally determined by the Court of Appeals for the District of Columbia Circuit sub nom. *SCM Corporation* v. *Langis Foods Ltd.*, 539 F. 2d 196, 190 USPQ 288 (1976). The court stated that the issue of whether an applicant filing an application under the provisions of section 44(d) of the Trademark Act need allege use of the mark was not presented to the District Court or to the Court of Appeals in the case it decided. Therefore, the issue of whether an applicant filing in application under the provisions of section 44 of the Trademark Act need allege use of the mark somewhere and submit specimens to show such use remains for determination.

The last ruling by the Patent and Trademark Office was *John Lecroy & Son, Inc.* v. *Langis Foods Ltd.*, 117 USPQ 717 (TTAB 1973) in which the Board stated "There is nothing in the Act authorizing the Patent Office to require of a

foreign applicant under section 44(d) use of his mark prior to the filing of his application in his home country * * *," page 719. The Board expressly overruled *In re Certain Incomplete Trademark Applications* 137. USPQ 69 (Comr. Pats. 1963), which held that an allegation of use of the mark somewhere and specimens were required. This reversed the ruling of *Ex parte Society Fromageries Bel*, 105 USPQ 392 (Comr. Pats. 1955), which had reversed the ruling of *Ex parte British Insulated Callender's Cables Ltd.*, 83 USPQ 319 (Comr. Pats. 1949).

The Court of Appeals in *SCM Corporation* v. *Langis Foods Ltd., supra,* held that under section 44(d) of the Trademark Act a foreign applicant obtained a constructive use date in the United States as of the filing date of the first application in a convention country.

In light of that decision, it is proposed that the Commissioner rescind the policy set forth in *In re Certain Incomplete Trademark Applications, supra,* to reflect the concept that a filing in a foreign country creates a constructive use of the trademark in the United States sufficient for filing an application under section 44(d) of the Trademark Act. Likewise, a foreign registration would be construed to be constructive use for the purpose of filing an application under section 44(e) of the Act. Accordingly, an application filed under section 44 need not allege use of the mark or be accompanied by specimens. However, the applicant filing under section 44(d) would be required to submit a certified copy of the application which is the basis of a priority claim and the applicant filing under section 44(e) must still submit a certification or certified copy of the registration in the country of origin of applicant.

The Lisbon revision of Article 4A of the Paris Convention, ratified by the United States on January 4, 1962, provides that a regular national filing in any Convention country shall give rise to a right of priority, whatever may be the subsequent fate of that application. Thus a foreign applicant may file in the United States, claiming priority under section 44(d) but relying on use in commerce rather than a registration under section 44(e).

Notice is hereby given that pursuant to the authority contained in section 41 of the Act of July 5, 1946 (60 Stat. 440, 15 U.S.C. 1123) and section 6 of the Act of July 19, 1952, as amended (85 Stat. 364, 88 Stat. 1949, 35 U.S.C. 6 as amended), the Patent and Trademark Office proposes to amend Title 37 of the Code of Federal Regulations by amending §§ 221.21, 2,39, 2.56, 4.1 and 4.7.

It is proposed to revise and amend the sections as follows (additions are indicated by arrows; deletions are bracketed):

PART 2—RULES OF PRACTICE IN TRADEMARK CASES

1. By amending § 2.21(a) to read as follows:

§ 2.21 *Requirements for receiving a filing date.*

(a) Materials submitted as an application for registration of a mark will not be accorded a filing date as an application until all of the following elements are received:

* * * * *

(5) At least one specimen or facsimile of the mark as actually used ►, except that a specimen or facsimile is not required when § 2.39 is applicable◄;

* * * * *

2. By revising paragraphs (a) and (b) and by the addition of new paragraphs (c) and (d) to § 2.39 to read as follows:

§ 2.39 *Omission of* ►*allegations*◄ [*allegation*] *of use* [*in commerce*] *by foreign applicants.*

(a) The ►allegations◄ [allegation] that the mark is in use in commerce ►and that the specimens or facsimiles show the mark as actually used in connection with the goods◄, required by § 2.33(b), and the statements of the dates of applicant's first use ►and that the applicant has adopted and is using the mark shown in the accompanying drawing◄, required by § 2.33(a) (1) ►(iv),◄ (vii), and (viii), may be omitted in the case of an application filed pursuant to section 44(e) of the act for registration of a mark duly registered in the country of origin of a foreign applicant, provided the application when filed is accompanied by a ►certification or certified copy issued by◄ [certificate of] the trademark office of the [foreign] country ►of origin of applicant◄ showing that the mark has been registered in [the] ►that◄ country [of origin of the applicant] and also showing the mark, the goods for which registered and that said registration is then in full force and effect. If the ►certification or certified copy◄ [certificate] is not in the English language, a translation is required.

(b) Such allegations and statements may also be omitted in the case of an application claiming the benefit of a prior foreign application in accordance with section 44(d) of the act. The application in such case shall state the date and country of the first foreign application [and,] ►. A certification or certified copy issued by the trademark office of the country where the first foreign application was filed shall accompany the application or be submitted within such time as is specified by the office. The certification or certified copy shall show the mark, the goods for which the first foreign application was filed, and the date of filing thereof. If the certification or certified copy is not in the English language, a translation is required. Before◄ [before] the application can be considered as allowable ►in the absence of an allegation of use in commerce◄, there must be filed a ►certification or certified copy issued by◄ [certificate of] the trademark office of the [foreign] country ►of origin of applicant◄ showing that the mark has been registered in [the] ►that◄ country [of origin of the applicant] and also showing the mark the goods for which registered and the date of ►issue of the registration. If the certification or certified copy is not in the English language, a translation is required.◄ [filing of the application. In such cases the specification of goods shall not exceed the scope of that covered by the foreign registration or application.] In the event the application is based upon a subsequent regularly filed application in the same foreign country the application must so state and must show that any prior filed application has been withdrawn, abandoned or otherwise disposed of, without having been laid open to public inspection and without having any rights outstanding, and has not served as a basis for claiming a right of priority.

►(c) The foreign application or the foreign registration, which is the basis of a claim to registration under section 44(d) or 44(e) of the act, shall be deemed to be constructive use of the mark for the purpose of filing an application under the act.◄

►(d) The specification of goods identified in an application filed under section 44(d) or 44(e) of the act shall not exceed the scope of that covered by the foreign application or registration, and, furthermore, such identification of goods in the application under the act shall include only those goods on or in association with which the applicant is actually using the mark or has a bona fide intention to use the mark on the filing date of the application under the act.◄

3. By revising § 2.56 to read as follows:

§ 2.56 *Specimens.*

The application must include five specimens of the trademark as actually used on or in connection with the goods in commerce. The specimens shall be duplicates of the actually used labels, tags, or containers, or the displays associated therewith or portions thereof, when made of suitable flat material and of a size not to exceed 8½ inches (21.6 cm.) wide and 13 inches (33.0 cm.) long. ►Specimens are not required when § 2.39 is applicable, but if commercial specimens are available, the applicant is encouraged to submit such specimens.◄

PART 4—FORMS FOR TRADEMARK CASES

f. By amending the "Notes" following § 4.1 by renumbering paragraph (2) as (2)(b), paragraph (3) as (3)(b), and paragraph (5) as (5)(b) and adding subparagraphs (2)(a), 3(a), and 5(a) to read as follows:

NOTES.—[Amended]

►(2)(a) A foreign applicant relying upon section 44(d) or 44(e) of the act shall specify only those goods which are comprehended within the identification of goods of the foreign application or registration upon which he relies and on which, on the filing date of the application, he is actually using the mark or has a bona fide intention to use the mark.◄

* * * * *

►(3)(a) A foreign applicant relying upon section 44(d) or 44(e) of the act may omit the allegations of the date of first use of the mark, the date of first use of the mark in commerce and that the mark is now in use in such commerce.◄

►(5)(a) A foreign applicant relying upon section 44(d) or 44(e) of the act who does not allege use of the mark may omit specimens and an allegation that specimens showing the mark as actually used are presented with the application, but if commercial specimens are available, the applicant is encouraged to submit such specimens.◄

* * * * *

5. By amending the "Notes" following § 4.7 by renumbering paragraph (12) as (12)(a) and adding subparagraph (b) to read as follows:

NOTES [Amended]

* * * * *

►(12)(b) A foreign applicant relying upon section 44(d) or 44(e) of the act who does not allege use of the mark may omit specimens and an allegation that specimens showing the mark as actually used as presented with the application, but if commercial specimens are available, the applicant is encouraged to submit such specimens.◄

Dated: July 22, 1977.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Approved: August 3, 1977.

HOWARD I. FORMAN,
Acting Assistant Secretary for Science and Technology.

[FR Doc. 77-23095; Filed 8-9-77; 8:45 am]

May–July 1977 Classification Orders

The reclassifications covered by the following classification changes became effective between May 31 and July 1977.

	Class	Subclasses
Classification Order 588, effective May 31, 1977:		
Abolished	244	40-44.
Established	244	198-219.
Classification Order 589, effective May 31, 1977:		
Abolished	222	176-178.
Established	222	608-628.
Classification Order 590, effective June 21, 1977:		
Abolished	19	.32; 144.5; 161.
	28	All.
Established	19	66.1; 66.2; 161.1.
	(New) 28	100-299.
	29	4.6.
Classification Order 591, effective June 27, 1977:		
Abolished	340	172.5.
	444	All.
Established	(New) 364	200; 300; 900.
Classification Order 592, effective June 28, 1977:		
Abolished	321	All.
Established	(New) 363	1-178.
Classification Order 593, effective June 28, 1977:		
Abolished	425	242-252; 302; 305; 324; 326; 342; 387 and Digests 203-216 and 232-234.
Established	425	302.1; 305.1; 324.1; 326.1; 342.1; 387.1 and 522-595.
Title changes	425	Digest 231.

ALFRED C. MARMOR,
Administrator for Documentation,
August 10, 1977.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,611,813, Sharpless and Eichert, Jr., MAGNETIC DATA STORAGE SYSTEM, **filed** Sept. 19, 1966, D.C. Md. (Baltimore) Doc. 17653-W, *Technitrol, Inc.* v. *Control Data Corporation.* Case transferred to the United States Court of Appeals, Fourth Circuit, Va. (Richmond) Doc. 75-1857. Judgment, it is ordered and adjudged by United States Court of Appeals for the Fourth Circuit that the judgment of the said District Court appealed from is hereby vacated and the case is remanded for proceedings consistant with the opinion of said Court of Appeals, Mar. 8, 1977.

2,875,450, H. M. Umann, SANITARY FIXTURE; **3,196,250,** same, HOT AIR BLOWER; **3,247,524,** same, HYGIENIC APPARATUS FOR USE ON TOILET BOWLS; **3,308,847,** same, SOLENOID-OPERATED, SHUT-OFF AND REGULATOR VALVE, **filed** May 3, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-1600-IH, *Rusco Industries, Inc. et al.* v. *Joseph Robinson, doing business as American Bidet Service Co.*

2,921,511. (See 2,848,914.)

2,931,284. (See 2,848,914.)

2,961,105, J. M. Shubin, REFUSE VEHICLE AND LOADING APPARATUS THEREFOR, **filed** Apr. 11, 1977, D.C., N.D. Calif. (San Francisco) Doc. C-77-733-SW, *Maxon Industries, Inc. et al.* v. *Able Body Co. Inc.*

2,998,258, A. A. Ambrose, ADAPTER FOR LATHE CHUCK AND THE LIKE, **filed** June 30, 1976, D.C., E.D. Mich. (Detroit) Doc. 76-71374, *True Grip, Inc.* v. *Sturdy Broaching Service, Inc.* Order of dismissal with prejudice as to any claim or counterclaim prior to the date of this order and without prejudice as to any claim or counterclaim which may arise subsequent to this order, Apr. 26, 1977.

3,009,235, G. De Mestral, SEPARABLE FASTENING DEVICE, **filed** May 4, 1977, D.C., S.D.N.Y., Doc. 77-C-2167, *Actief N.V.* v. *Consolidated Foods Corp.*

3,065,759, F. Lewis, HAIR STRAIGHTENING METHOD AND APPARATUS, **filed** Apr. 15, 1977, D.C., S.D.N.Y., Doc. 77-C-1832 CBM, *Frederick Lewis* v. *Clairol, Inc. et ano.*

3,168,978, Garnier, Rubet, Desroches, Marchal and Lutz, TURBOMOLECULAR VACUUM PUMP, **filed** May 2, 1977, D.C., N.D. Calif. (San Francisco), Doc. C77-888-SC, *Sargent-Welch Scientific Company* v. *Airco, Inc. et al.*

3,196,250. (See 2,875,450.)

3,206,623, A. E. Snowdon, ELECTRIC SYNCHRONOUS INDICATOR MOTOR, **filed** Apr. 18, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-1393-RJK, *The Superior Electric Company* v. *Computer Devices Corporation.*

3,212,632, Baum and Mosetich, FASTENER ASSEMBLAGE; **3,342,659,** same, METHOD OF MAKING ASSEMBLED FASTENER STRIPS, **filed** Sept. 22, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c3149, *Duo-Fast Corp.* v. *Spotnails, Inc.* Enter stipulated order dismissing cause with prejudice, Apr. 14, 1977.

3,247,524. (See 2,875,450.)

3,304,316, Geraci and Chodsky, PHENYL MERCURY SALTS OF BRANCHED CHAIN ALIPHATIC MONOCARBOXYLIC ACIDS, **filed** May 6, 1977, United States Court of Claims (District of Columbia) Doc. 250-77, *Orthopedic Equipment Company, Inc. and Marriott Corporation* v. *The United States.*

3,308,847. (See 2,875,450.)

3,316,574, R. L. Pare, ROAD EXPANSION JOINT; **Re. 26,733,** J. A. Welch, ELASTOMERIC EXPANSION JOINT, **filed** Nov. 9, 1972, D.C. Del. (Wilmington) Doc. 4514, *Robert L. Pare and The General Tire & Rubber Company* v. *Watson-Bowman Associates, Inc.* Final judgment, the complaint and counterclaim and all amendments of each herein be and the same are hereby dismissed, Apr. 25, 1977.

3,342,659. (See 3,212,632.)

3,371,455, G. C. Fox, SWIMMING POOL STRUCTURE, **filed** July 22, 1976, D.C.N.J. (Trenton) Doc. 76-1420, *Fox Pool Corp.* v. *Paul Lewis, doing business as American Pools.* Consent judgment for permanent injunction against defendant, May 4, 1977.

3,391,732, C. B. Murray, RADIATOR CONSTRUCTION, **Reg. No. 702,168** (MESABI), L & M Radiator Service, Inc., **filed** Apr. 21, 1977, D.C. Ariz. (Tucson) Doc. C-77-84-Tuc, *L & M Radiator, Inc.* v. *Industrial Radiator Service Co., Inc.*

3,427,997, Brown, Jr., Butler, Carter, Ferik and Ogle, INFLATABLE BULKHEAD FOR RAILROAD CAR; **Re. 27,615,** same, **filed** Sept. 28, 1973, D.C., N.D. Ill. (Chicago) Doc. 73c2498, *General Foods Corporation et al.* v. *Unarco Industries, Inc.* Order cause is dismissed with prejudice, Apr. 25, 1977.

3,434,209, B. Weissman, METHOD FOR BUILDING SUPERSTRUCTURES ON DENTITION, **filed** Apr. 27, 1977, D.C., S.D.N.Y., Doc. 77-C-2089, *Ipco Hospital Supply Corp.* v. *Pulpment Corp. of America.*

3,447,278, H. W. Collins, TRUSS ELEMENT; **3,641,303,** same, METHOD AND APPARATUS FOR CONTINUOUSLY MAKING TRUSS ELEMENTS, **filed** Dec. 5, 1974 D.C., S.D. Ohio (Cincinnati) Doc. C-1-74-484, *United States of America* v. *Integrated Building Industry, Inc. et al.* Judgment entered in accordance with findings of fact and conclusions of law, Apr. 19, 1977.

3,522,814, G. R. Olson, WASHER FOR PARTS AND THE LIKE, **filed** May 2, 1977, D.C., N.D. Calif. (San Francisco) Doc. C–77–0887–RHS, *Safety-Kleen Corp.* v. *Jack C. Stephens.*

3,641,303. (See 3,447,278.)

3,713,126, J.C. Stetner, BURGLAR DETERRENT TIMING SWITCH, **filed** May 12, 1977, D.C., E.D. Mo. (St. Louis) Doc. 77 498C(2), *Novar Electronics Corp.* v. *World Finance Company.* **Same, filed** May 16, 1977, D.C., N.D. Ala. (Birmingham) Doc. 77–L–0664–S, *Novar Electronics Corporation* v. *Audio Interface Systems, Inc.*

3,724,798, J. A. Lucasey, STAND FOR SUPPORTING AN APPLIANCE, **filed** Apr. 29, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c1503, *Lucasey Manufacturing Corporation* v. *Peerless Industries, Inc. and Peerless Sales Company.*

3,811,171, W. L. Grube, PIERCE NUT APPLYING TOOL; **3,999,659,** same, PIERCE NUTS IN STRIP FORM, **filed** Apr. 20, 1977, D.C., E.D. Mich. (Detroit) Doc. 77–70969, *Multifastener Corporation* v. *MacLean-Fogg Lock Nut Co.*

3,909,392, Horecky, Jr., Fahrig, Shields and McKinney, FLUID CATALYTIC CRACKING PROCESS WITH SUBSTANTIALLY COMPLETE COMBUSTION OF CARBON MONOXIDE DURING REGENERATION OF CATALYST, **filed** May 6, 1977, D.C., S.D. Tex. (Houston) Doc. CA H–77–709, *Standard Oil Co.* v. *Charter International Oil Co. et al.*

3,934,297, D.C. Hanna, OVERHEAD CAR WASHES; **3,939,516,** same, MODULE CAR WASH, **filed** Apr. 14, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77–1370–LEW, *Daniel C. Hanna* v. *Allen Group, Inc. et al.*

3,939,516. (See 3,934,297.)

3,999,659. (See 3,811,171.)

Re. 26,733. (See 3,316,574.)

Re. 27,615. (See 3,427,997.)

Reg. No. 792,168. (See 3,391,732.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

Re. 28,257, Re. S.N. 813,212, Filed July 5, 1977, Cl. 340/172.5, METHODS AND APPARATUS FOR REMOVING PARITY BITS FROM BINARY WORDS, William H. Spencer, et al., Owner of Record: *Bell & Howell Company, Chicago, Ill.,* Attorney or Agent: Luc P. Benoit, Ex. Gp.: 237

3,559,507, Re. S.N. 812,413, Filed July 1, 1977, Cl. 74/801, GEAR WRENCH, Paul Heinz Wagner, Owner of Record: *Inventor,* Attorney or Agent: Terrell C. Birch, et al., Ex. Gp.: 345

3,646,748, Re. S.N. 789,555, Filed Apr. 20, 1977, Cl. 57/149, TENDONS FOR PRESTRESSED CONCRETE AND PROCESS FOR MAKING SUCH TENDONS, Frederic A. Lang, Owner of Record: *Pic Inc., Landenburg, Pa.,* Attorney or Agent: Robert B. Washburn, Ex. Gp.: 244

3,876,652, Re. S.N. 807,055, Filed June 16, 1977, Cl. 260/302 R, CERTAIN 5-ALKOXY-4-ISOBUTYLTHIAZOLES, Alan O. Pittet, et al., Owner of Record: *International Flavors & Fragrances, Inc., New York, N.Y.,* Attorney or Agent: Arthur L. Liberman, et al., Ex. Gp.: 122

3,910,055, Re. S.N. 812,549, Filed July 5, 1977, Cl. 61/45, CABLE ATTACHMENTS, Brian Edgar Lund Biram, Owner of Record: *C. C. L. Systems Limited, Surbiton, Surrey, England,* Attorney or Agent: A. D. Caesar, et al., Ex. Gp.: 351

3,941,514, Re. S.N. 814,798, Filed July 11, 1977, Cl. 417/216, TORQUE LIMITING CONTROL, Joseph E. Louis, et al., Owner of Record: *Sundstrand Corporation, Rockford, Ill.,* Attorney or Agent: Ernest A. Wegner, et al., Ex. Gp.: 343

3,964,647, Re. S.N. 813,220, Filed July 6, 1977, Cl. 222/174, SPRAY DISPENSING DEVICE, Harry S. Dearling, Owner of Record: *Tobe Dearling, New York, N.Y.,* Attorney or Agent: Leonard J. Santisi, Ex. Gp.: 311

3,985,194, Re. S.N. 813,234, Filed July 6, 1977, Cl. 180/89 A, TILT CAB POWER STREAM AND VALVE CONTROL THEREFOR, Dale A. Knutson, Owner of Record: *Applied Power, Inc., Milwaukee, Wis.,* Attorney or Agent: John J. Byrne, et al., Ex. Gp.: 316

3,991,843, Re. S.N. 813,223, Filed July 5, 1977, Cl. 180/33 C, CYCLES, Charles Patrick Duncan Davidson, Owner of Record: *The Lucas Electrical Company Limited, Birmingham, England,* Attorney or Agent: John Clarke Holman, et al., Ex. Gp.: 316

4,011,159, Re. S.N. 814,732, Filed July 11, 1977, Cl. 210/40, METHOD OF REMOVAL OF PETROLEUM PRODUCTS FROM SOLID OR LIQUID SURFACES, Claude Stein, et al., Owner of Record: *Societe Chimique des Charbonnages, Paris, France,* Attorney or Agent: Karl W. Flocks, Ex. Gp.: 176

4,020,036, Re. S.N. 814,066, Filed July 8, 1977, Cl. 260/40 R, THERMOSETTING POLYESTER COMPOSITION CONTAINING NORMALLY SOLID CARBOXY-CONTAINING DIENE POLYMER, Aubrey South, Jr., Owner of Record: *Phillips Petroleum Company, Bartlesville, Okla.,* Attorney or Agent: Donald J. Quigg, et al., Ex. Gp.: 141, Sept. 6, 1977

PATENT NOTICES

Certificates of Correction for the Week of Sept. 6, 1977

P.P. 4,063	3,963,001	3,995,763	4,002,698	4,014,905	4,021,302	4,024,473	4,026,950
P.P. 4,064	3,963,353	3,995,813	4,003,052	4,014,996	4,021,370	4,024,516	4,027,089
Re. 29,147	3,965,437	3,995,820	4,005,877	4,015,044	4,021,533	4,024,624	4,027,344
D. 244,662	3,967,252	3,995,821	4,006,024	4,015,508	4,021,686	4,024,734	4,027,523
3,334,067	3,969,546	3,996,071	4,006,046	4,016,042	4,021,712	4,024,902	4,027,771
3,642,868	3,970,728	3,996,174	4,006,806	4,016,113	4,021,968	4,024,973	4,027,821
3,681,358	3,971,739	3,996,211	4,007,046	4,016,235	4,022,019	4,025,046	4,028,087
3,687,392	3,972,856	3,996,245	4,008,663	4,016,245	4,022,583	4,025,059	4,028,116
3,755,097	3,975,013	3,996,257	4,008,819	4,016,616	4,022,615	4,025,087	4,028,119
3,763,013	3,976,729	3,996,266	4,009,042	4,017,359	4,022,619	4,025,241	4,028,405
3,773,695	3,978,457	3,996,267	4,009,964	4,017,365	4,022,721	4,025,361	4,028,466
3,775,290	3,981,859	3,996,359	4,010,233	4,017,662	4,022,816	4,025,400	4,028,527
3,775,294	3,983,291	3,996,374	4,010,556	4,017,730	4,022,909	4,025,572	4,028,599
3,779,968	3,984,601	3,997,704	4,011,068	4,018,067	4,023,437	4,025,600	4,029,833
3,825,068	3,991,271	3,998,112	4,011,083	4,018,596	4,023,475	4,025,885	4,029,910
3,827,499	3,992,534	3,998,152	4,011,919	4,018,679	4,023,605	4,026,045	4,030,147
3,845,119	3,993,443	3,998,299	4,012,429	4,018,952	4,023,692	4,026,316	4,034,454
3,889,842	3,993,447	3,998,714	4,013,591	4,019,960	4,023,755	4,026,738	4,034,906
3,896,677	3,993,877	4,000,461	4,013,681	4,020,287	4,023,823	4,026,782	
3,916,997	3,994,237	4,001,806	4,014,194	4,020,298	4,024,215	4,026,870	
3,954,910	3,995,085	4,001,858	4,014,271	4,020,538	4,024,337	4,026,886	
3,959,327	3,995,554	4,001,882	4,014,325	4,021,032	4,024,451	4,026,947	

Disclaimers

Design No. 244,913.—*Carl Brandenfels,* Scappoose, Oreg. MOBILE KITCHEN TABLE. Patent dated July 5, 1977. Disclaimer filed July 22, 1977, by the assignee, *H.T. Products, Inc.*

The term of this patent subsequent to Dec. 9, 1989, has been disclaimed.

3,320,090.—*Lawrence Graubart,* Daly City, Calif. PHENOXY-POLYURETHANE MAGNETIC TAPE BINDER. Patent dated May 16, 1967. Disclaimer filed July 11, 1977, by the assignee, *Ampex Corporation.*

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

3,992,508.—*Shigeru Saitoh, Tetsuya Watanabe, Koji Konno,* and *Tadashi Nakamura,* Iwaki, Japan. METHOD OF REMOVING NITROGEN OXIDES FROM A GAS CONTAINING NITROGEN OXIDES. Patent dated Nov. 16, 1976. Disclaimer filed May 31, 1977, by the assignee, *Kureha Kagaku Jogyo Kabushiki Kaisha.*

The term of this patent subsequent to Nov. 9, 1993, has been disclaimed.

Dedication

3,725,126.—*Willis D. Haller,* St. Paul, and *Raymond M. Colline,* Oakdale, Minn. MAGNETIC RECORDING TAPE. Patent dated Apr. 3, 1973. Dedication filed June 14, 1977, by the assignee, *Minnesota Mining and Manufacturing Company.*

Hereby dedicates to the Public the remaining term of said patent.

Disclaimer and Dedication

3,882,646.—*Gene A. Stritzel,* Webster, N.Y. GRINDING WHEEL ASSEMBLY HAVING MULTIPLE GRINDING SURFACES FOR SELECTIVE ENGAGEMENT WITH A WORKPIECE. Patent dated May 13, 1975. Disclaimer and dedication filed July 20, 1977, by the assignee, *The Gleason Works.*

Hereby disclaims and dedicates to the Public all claims of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 2, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-23-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-3-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-19-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	4-8-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	4-28-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-14-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-12-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	11-17-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-14-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-29-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-14-70
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-24-76

Expiration of patents: The patents within the range of numbers indicated below expire during July 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,943,337 to 2,947,000, inclusive
Plant Patents..... Numbers 1,957 to 1,962, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED SEPTEMBER 6, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T962,001
PREPARATION OF DICALCIUM PHOSPHATE FROM PHOSPHATE ROCK BY THE USE OF SULFUR DIOXIDE, WATER, AND CARBONYL COMPOUNDS

John F. McCullough; John F. Phillips, Jr., and Leslie R. Tate, all of Florence, Ala., assignors to Tennessee Valley Authority

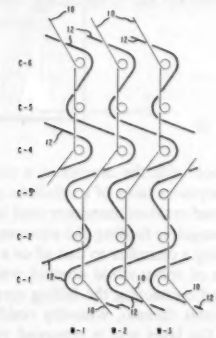
Filed Oct. 6, 1976, Ser. No. 730,210
Int. Cl.[2] C01B *15/16, 25/26;* C05B *11/14*
U.S. Cl. 423—307
1 Sheets Drawing. 33 Pages Specification

Dicalcium phosphate is prepared from phosphate rock by a process which comprises reacting phosphate rock with sulfur dioxide and an organic carbonyl compound for 0.5 to 10 hours while maintaining the temperature of the reaction mixture below 50° C. The reaction yields a mixture of gangue, solid calcium α-hydroxy sulfonate and soluble dicalcium phosphate. The solids are separated from the liquid and P_2O_5 values adhering to the solid are washed free with a mixture of carbonyl, water, and sulfur dioxide. The wash effluent is recycled to the process and both carbonyl and some sulfur dioxide are recovered from the filter cake by heating it. The offgas from the heated filter cake is recycled to the process and the dry filter cake, now largely calcium sulfite hemihydrate, is discarded. Dicalcium phosphate is precipitated from the reaction mixture filtrate in high yield by partially distilling sulfur dioxide from the filtrate. The precipitated anhydrous dicalcium phosphate is separated from the liquid and dried. Offgas from this drying process as well as both distillate and filtrate is returned to the process. Thus, the only starting materials consumed in the process are phosphate rock and sulfur dioxide. All carbonyl is recovered for recycle.

T962,002
ELASTIC WARP KNIT FABRIC

Francis Paul Moore, 1903 Harwyn Road, Wilmington, Del. 19810

Filed Apr. 4, 1977, Ser. No. 784,455
Int. Cl.[2] D04B *21/18*
U.S. Cl. 66—195
1 Sheets Drawing. 6 Pages Specification

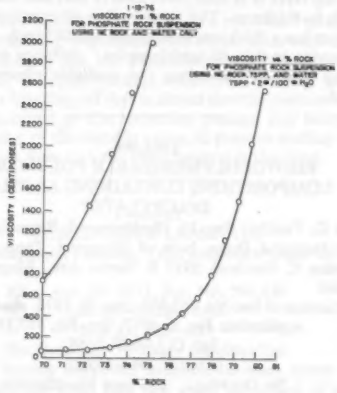


A Raschel warp knit structure of elastic (12) and non-elastic (10) yarns which produce a two-way stretch fabric. The new and unique feature of this invention is the stitch used to produce the fabric. The stitch consists of two groups of three chain stitches of non-elastic yarn into which is interlaced an elastic yarn. The elastic yarn traverses laterally in its path through the fabric to connect three adjacent wales.

T962,003
CONCENTRATED PHOSPHATE ROCK-WATER SUSPENSION FERTILIZER

Cecil P. Harrison, Florence, Ala., assignor to Tennessee Valley Authority

Filed Sept. 30, 1976, Ser. No. 728,304
Int. Cl.[2] C05B *13/02*
U.S. Cl. 71—33
2 Sheets Drawing. 16 Pages Specification



Processes for preparing concentrated phosphate rock-water suspension fertilizer with exceptionally satisfactory handling and storage properties are disclosed. Although there are various parameters in the processes that can be varied, they may, for the sake of convenience, be categorized in two embodiments. In the first embodiment, the process involves the blending together of water, fine-ground phosphate rock, and a small amount of a particle dispersant in proportions so that the final product contains 70–78 percent by weight of phosphate rock. In the second embodiment, the process involves the use of specialized procedures in the blending of water, fine-ground phosphate rock, gelling-type clay, and small amounts of dispersant and gelling agents in preparation of final product suspension containing 60 percent by weight of phosphate rock.

T962,004
METHOD OF PREPARING SILVER HALIDE GRAINS OF IMPROVED PHOTOGRAPHIC AND HANDLING CHARACTERISTICS

Claude G. Dostes; Dany C. Dubromel, and Jean-Francois Le Guen, all c/o Kodak Pathe, Vincennes, France

Continuation of Ser. No. 637,491, Dec. 3, 1975, abandoned. This application Mar. 29, 1977, Ser. No. 782,572
Int. Cl.[2] G03C *1/28, 1/30*
U.S. Cl. 96—110
No Drawing. 17 Pages Specification

A method is disclosed of forming silver halide grains capable of forming a surface latent image upon exposure to visible light. The grains are formed by incorporating from 10^{-6} to

10^{-10} mole of iridium per mole of silver before first ripening. The iridium is incorporated in the presence of a water soluble purine base or a water soluble salt thereof.

T962,005
SIMPLY INSTALLED FLOOR TILE

Homer Breault, Pine Glen, and Alvin E. Witt, both of Media, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 651,680, Jan. 23, 1976, abandoned. This application Mar. 23, 1977, Ser. No. 780,551

Int. Cl.[2] E04F *15/10*

U.S. Cl. 156—71

No Drawing. 9 Pages Specification

Instead of following the conventional practice of removing the previous floor covering of sheet linoleum, floor tiles or the like, the floor tiles of the present invention are so remarkably thin that they are laid on top of the old flooring while still providing adequate clearance for doors, drawers, and related items imposing limits on the floor elevation. The principal layer has a thickness of organic composition from 0.005 inch (5 mils) to 0.040 inch (40 mils) and the cured transparent polyurethane top layer is at least 0.001 inch (1 mil) and not more than 10 mils in thickness. The combination of principal layer and top layer has a thickness from 0.010 to 0.045 inch. By keeping the flooring so thin, its usefulness for installation over existing flooring without exceeding the available clearance is enhanced.

T962,006
PHOTOPOLYMERIZABLE POLYMERIC COMPOSITIONS CONTAINING AROMATIC DIACRYLATES

James G. Pacifici, Rte. 16, Heatherwood; Raymond D. Clark, 532 Dogwood Drive, both of Kingsport, Tenn. 37663, and Gordon C. Newland, 1917 E. Sevier Ave., Kingsport, Tenn. 37664

Continuation of Ser. No. 653,808, Jan. 30, 1976, abandoned. This application Jan. 6, 1977, Ser. No. 757,180

Int. Cl.[2] C08F *2/46*

U.S. Cl. 204—159.23

No Drawing. 16 Pages Specification

The invention relates to photopolymerizable polymeric compositions useful as coating and moldable compositions which are hardenable by ultraviolet radiation. These coating and moldable compositions comprise mixtures of photopolymerizable or photocrosslinkable acrylates of bis-(hydroxyalkyl) terephthalates and isophthalates in combination with at least one ethylenically unsaturated monomer component and a photoinitiator.

T962,007
TREATMENT OF TRANSITION METAL COMPOUND

Anthony David Caunt; Alan Branford Newton, both of Welwyn Garden City; Ian Gabriel Williams, Letchworth, and Michael Stanley Fortuin, Chester, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Oct. 18, 1976, Ser. No. 733,408

Claims priority, application United Kingdom, Oct. 29, 1975, 44633/75; Apr. 29, 1976, 17490/76; Apr. 29, 1976, 17491/76

Int. Cl.[2] C08F *4/64*

U.S. Cl. 252—429 B

No Drawing. 20 Pages Specification

According to the present invention (1) a titanium trihalide is ground in the presence of from 5 up to 75% molar, relative to the titanium trihalide, of (2) a Lewis Base compound which is an organo-phosphorus compound of the formula

$$R_1R_2R_3P(O)_a$$

and either (a) from 1 up to 50% molar, relative to the titanium trihalide, of a titanium tetrahalide and/or (b) from 0.2 up to 50% molar, relative to the titanium trihalide, of an oxidizing agent, wherein when a titanium tetrahalide is present, the molar quantity of the organo-phosphorus compound is at least equal to the molar quantity of the titanium tetrahalide.

The titanium halides (1) and (a) are preferably the chlorides. Suitable forms of titanium trichloride are obtained by the reduction of titanium tetrachloride with hydrogen, titanium metal, aluminum metal or an organo-aluminium compound. It is preferred to use a material of the type, titanium trichloride/aluminium chloride, such as is obtainable by the reduction of titanium tetrachloride with aluminium metal.

In the organo-phosphorus compound, R_1 is conveniently an alkyl group containing 2 to 10 carbon atoms. The groups R_2 and R_3 can be alkyl, aryl, cycloalkyl, alkaryl or aralkyl groups. Preferably, R_2 and R_3 are both alkyl groups and preferably R_1, R_2 and R_3 are all the same, for example, butyl as in tributylphosphine and tributylphosphine oxide.

Suitable oxidizing agents include oxygen gas or halogen-containing materials such as chlorine gas, carbon tetrachloride, hexachlorocyclopentadiene, stannic chloride, phosphorus pentachloride and iodine.

The product produced by grinding (1), (2) and either (a) and/or (b) above may be admixed with (A) to form an olefin polymerization catalyst, wherein

(A) is at least one organo-metallic compound of aluminium or of a non-transition metal of Group IIA of the Periodic System, or a complex of an organo-metallic compound of a non-transition metal of Group IA or IIA of the Periodic System and an organo-aluminium compound. That polymerization catalyst may be modified by the addition of a Lewis Base which is effective to modify the stereospecificity of the catalyst and/or a substituted or unsubstituted polyene.

T962,008
METHOD OF TREATING POLYMER LATICES

Bala Perampalam Chandra, Huntingdon; Jeffrey Chester Greaves, and Victor Gordon Lovelock, both of Welwyn Garden City, all of England, assignors to Imperial Chemical Industries Limited, London, England

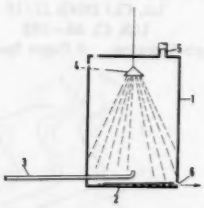
Filed Oct. 4, 1976, Ser. No. 728,994

Claims priority, application United Kingdom, Oct. 13, 1975, 41848/75

Int. Cl.[2] C08F *6/16*

U.S. Cl. 528—500

1 Sheets Drawing. 13 Pages Specification



In accordance with the invention, a method of continuously treating an aqueous latex of a synthetic polymer contaminated with unreacted residual monomer used in the production of the polymer, comprises feeding the aqueous latex as a spray into a vessel defining a chamber so that all or a substantial quantity of the droplets of spray avoid contact with the side wall of the chamber, and contacting the falling spray with steam flowing counter-current thereto, whereby residual monomer is separated from the latex and is removed with the flow of steam leaving the chamber. Preferably at least 80% by weight of the droplets of spray avoid contact with the side wall of the chamber. Apparatus which includes the vessel and means to provide a flow of steam up the chamber to contact the falling spray is also disclosed.

In this method all or most of the spray falls directly to the

bottom of the chamber without touching the side wall of the chamber. In this way foaming difficulties are avoided. The droplets of spray are contacted by the rising steam and monomer is removed with the steam flow. The latex which collects in the bottom of the vessel may be removed by any convenient method, e.g. by allowing it to run out of the chamber by gravity or by pumping it out of the chamber.

The chamber used in this method is conveniently defined by a wide cylindrical tube, the spray being introduced through a spraying head at the top of the tube. The size of the chamber used will depend, inter alia, on the required residence time of the latex in the chamber; the efficiency of monomer removal will depend on the residence time of the latex at a particular contact temperature. In this method a plurality of such chambers may be operated sequentially or contemporaneously.

The steam is preferably introduced into the chamber through a single injection point positioned at or near the bottom of the chamber although one or more injection points intermediate of the top and bottom of the vessel may be used as well.

The temperature of the steam before injection into the chamber may be within the range 60°–150° C, but is preferable at or near 100° C. The temperature of the steam inside the chamber may be adjusted by varying the pressure inside the chamber below atmospheric pressure, although for convenience, the pressure inside the chamber is often atmospheric so that the temperature of steam inside the reaction is at or near 100° C and this is a satisfactory arrangement for the treatment of many latices.

The method of the invention is especially suitable for the removal of vinyl chloride monomer from a homo- or copolymer of vinyl chloride.

T962,009

REDUCTION OF 2-ACYL-1-NAPHTHOLS TO 2-ALKYL-1-NAPHTHOLS

Robert Benson Fugitt, 23 Alwyn Road, Newark, Del. 19713

Continuation-in-part of Ser. No. 672,725, April 1, 1976, abandoned. This application Mar. 25, 1977, Ser. No. 781,105

Int. Cl.² C07C *39/14*

U.S. Cl. 260—624 C

No Drawing. 9 Pages Specification

Hydrogenation of 2-acyl-1-naphthols at 200 to 1000 pounds per square inch and 115° to 200° C. in the presence of a copper chromite catalyst produces the corresponding 2-alkyl-1-naphthols. These compounds are useful in the synthesis of 2-alkyl naphthoquinone miticides.

T962,010

VARIABLE VENTURI CARBURETOR IDLE SPEED FUEL CONTROL

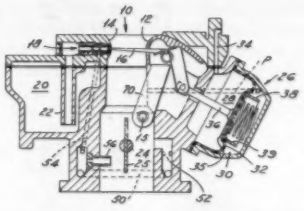
Frank T. Newbury, Barnsfield, High Easter Road, Dunmow, Essex, and Terence Inkpen, 7 Oakwood Court, Althorne, Chelmsford, Essex, both of England

Continuation of Ser. No. 670,475, March 25, 1976, abandoned. This application Feb. 18, 1977, Ser. No. 770,161

Int. Cl.² F02M *9/06*

U.S. Cl. 261—41 D

2 Sheets Drawing. 12 Pages Specification



A variable area venturi carburetor has a movable venturi wall with a fuel metering rod attached for cooperation with aligned main and auxiliary fuel jets located in an opening in the fixed venturi wall, a bypass passage connected between the jets siphoning or bleeding off fuel at closed throttle positions into a passage connected to the induction passage just below the closed position of the throttle valve, to prevent stalling of the engine by fuel flow into the main venturi at this time.

T962,011

COEXTRUDED LAMINATE

Roland O. Muehlner, Houston, Tex., assignor to Shell Oil Company

Filed Apr. 25, 1977, Ser. No. 790,529

Int. Cl.² B32B *27/08*

U.S. Cl. 428—517

No Drawing. 7 Pages Specification

A laminate having improved adhesion between sheets comprises at least one sheet of a first sheet composed of a high monoalkenyl arene content polymer and at least one sheet of a second sheet composed of block copolymers of monoalkenyl arenes and conjugated dienes, said block copolymer containing about 0.1 to about 10 percent by weight of a fatty acid amide, said first and second sheets being formed by coextrusion. In a preferred embodiment, the high monoalkenyl arene content polymer is polystyrene, the block copolymer is a styrene-butadiene copolymer, and the fatty acid amide is ethylene bis stearylamide.

REISSUES

SEPTEMBER 6, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,382
MULTIFILAMENT YARNS FOR REINFORCING ARTICLES

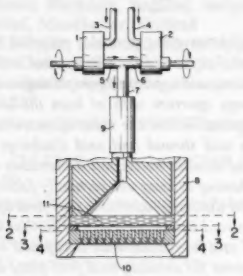
Wilhelmus J. Fontijn, Dieren, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

Original No. 3,447,308, dated June 3, 1969, Ser. No. 663,812, Aug. 28, 1967. Continuation-in-part of Ser. No. 580,817, Sept. 20, 1966, abandoned. Application for reissue Mar. 1, 1972, Ser. No. 230,815

Claims priority, application Netherlands, Oct. 6, 1965, 6512918; Aug. 28, 1966, 6612628

Int. Cl.[2] D02G *3/04*; D01D *7/04*

U.S. Cl. 57—140 R 12 Claims



1. Yarn consisting of a plurality of composite filaments, each filament comprising at least two different incompatible synthetic linear high polymers, one polymer functioning as a matrix and the other consisting of a multiplicity of continuous ultrafine cores distributed substantially uniformly throughout the longitudinal body of the matrix each core being characterized by its uniformity in cross-sectional dimension and the cross-sectional dimensions from core to core being of the same order of magnitude, said cores being further characterized by their substantially continuous nature.

Re. 29,383
DIGITAL FLUID FLOW RATE MEASUREMENT OR CONTROL SYSTEM

Robert A. Gallatin, Redondo Beach, and Addison W. Langill, Jr., Balboa, both of Calif., assignors to Process Systems, Inc., Salt Lake City, Utah

Original No. 3,875,955, dated Apr. 8, 1975, Ser. No. 432,158, Jan. 10, 1974. Application for reissue Jan. 31, 1977, Ser. No. 764,339

Int. Cl.[2] G01G *1/00*

U.S. Cl. 137—14 62 Claims

1. A digital fluid flow rate measurement or control system comprising:

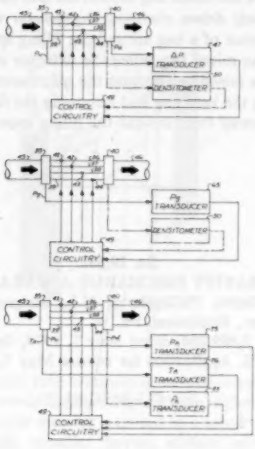
a source of fluid at a first pressure;

a fluid receiver at a second pressure lower than the first pressure;

a plurality of individually actuatable, value weighted digital bistable valve elements interconnecting the source to the receiver, each valve element assuming exclusively either an open state in which fluid flows from the source through the valve element to the receiver or a closed state in which no fluid flows from the source through the valve element to the receiver such that the resultant fluid flow rate from the source to the receiver is a function of the product of a flow rate determinative fluid parameter times the sum of the weighted values of the digital valve elements in the open state;

means for sensing the fluid parameter and generating a first signal representative of the value of the fluid parameter;

means responsive to the value of the fluid parameter and the



states of the digital valve elements for generating a second signal representative of the value of the resultant fluid flow rate; and

means responsive to one of the signals for controlling the states of the digital valve elements so as to maintain constant the value represented by the one signal.

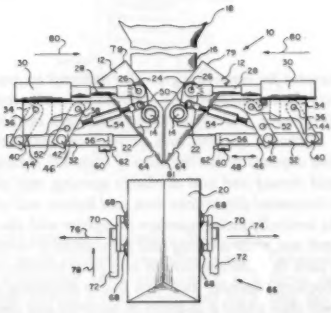
Re. 29,384
EXPANDING FILL SPOUT FOR BAG FILLING MACHINE

Doyle R. Hudson, West Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Original No. 3,750,721, dated Aug. 7, 1973, Ser. No. 172,688, Aug. 18, 1971. Application for reissue Aug. 1, 1975, Ser. No. 601,248

Int. Cl.[2] B65B *1/04*

U.S. Cl. 141—10 8 Claims



8. A method for rapidly and automatically filling a bag with

a plurality of objects from a *split sleeve* filling spout *with clamps positioned about it* comprising the steps of:

a. positioning the bag below the *split sleeve* filling spout;

b. automatically raising the bag upwardly towards the *split sleeve* filling spout while opening the bag and positioning the upper portion of the bag around the *split sleeve* filling spout;

c. automatically *pivoting the split sleeves of the filling spout outwardly while horizontally and positively driving the clamps inwardly against the bag and hence the bag against the outwardly pivoted split sleeves and thereby* holding the upper portion of the raised bag around the *split sleeve* filling spout *in positively driven clamping engagement* while detecting the presence of a bag around the filling spout;

d. filling the raised bag when the detector signals the presence of a raised bag around the *split sleeve* filling spout;

e. releasing the held bag and removing the filled bag downwardly away from around the filling spout.

Re. 29,385

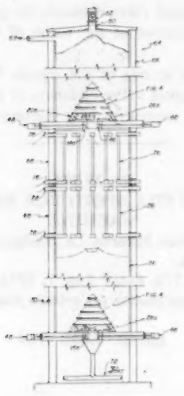
GRAVITY DISCHARGE APPARATUS

Frank J. Miksitz, Phillipsburg, N.J., assignor to Universal Feeders, Inc., Bethlehem, Pa.

Original No. 3,809,286, dated May 7, 1974, Ser. No. 216,105, Jan. 7, 1972. Application for reissue May 7, 1976, Ser. No. 684,192

Int. Cl.² B65G 65/70

U.S. Cl. 222—1 **15 Claims**



10. Apparatus for conveying granular material by gravity assist from a mass thereof supported on a horizontal wall provided with a discharge opening, said apparatus comprising: a shroud disposed above the discharge opening with at least the lower end of the shroud being disposed within the mass of material; a plate disposed between said shroud and said discharge opening, said plate being of smaller horizontal dimensions than said bottom wall and having at least one vertically facing aperture in register with the discharge opening; and means for orbiting said plate about a vertical axis in a manner such that the aperture in said plate remains in register with the discharge opening and such that a peripheral portion of the plate will slide under a quantity of material and then carry at least a portion of that quantity inwardly toward said aperture whereby material continuously flows inwardly to said aperture along a path which moves around the periphery of said aperture.

Re. 29,386

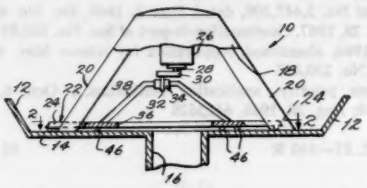
GRAVITY DISCHARGE APPARATUS

Frank J. Miksitz, Phillipsburg, N.J., assignor to Alfred L. Miksitz, Bethlehem, Pa.

Original No. 3,874,566, dated Apr. 1, 1975, Ser. No. 467,558, May 6, 1974. Continuation-in-part of Ser. No. 216,105, Jan. 7, 1972, Pat. No. 3,809,286. Application for reissue May 7, 1976, Ser. No. 684,190

Int. Cl.² B65D 83/06

U.S. Cl. 222—404 **12 Claims**



10. Apparatus for conveying granular material by gravity assist from a mass thereof supported on a horizontal wall provided with a discharge aperture, said apparatus comprising: a shroud disposed above the discharge aperture with at least the lower end of the shroud being disposed within the mass of material; a feed plate disposed between said shroud and said discharge aperture, said feed plate being of smaller horizontal dimensions than said horizontal wall and having at least one vertically facing feed aperture in register with the discharge aperture, said feed aperture being of greater area than said discharge aperture so that a portion of the upper surface of said horizontal wall is exposed within said feed aperture; and means for orbiting said feed plate about a vertical axis in a manner such that the feed aperture remains in register with the discharge aperture and such that a peripheral portion of the feed plate will slide under a quantity of material and then carry at least a portion of that quantity inwardly toward said feed aperture whereby material continuously flows inwardly to said aperture along a path which moves around the periphery of said aperture and whereby the material is then pushed over the edge of the discharge aperture in the form of a continuous stream.

Re. 29,387

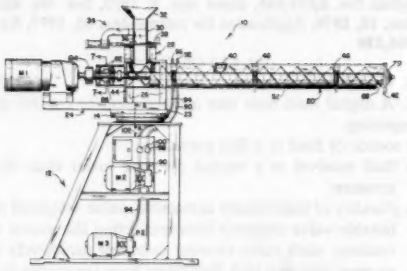
APPARATUS FOR THE CONTINUOUS MIXING OF GRANULAR MATERIALS

Robert S. Lund, Elmhurst, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Original No. 3,730,487, dated May 1, 1973, Ser. No. 175,047, Aug. 26, 1971. Application for reissue Dec. 23, 1976, Ser. No. 753,808

Int. Cl.² B01F 7/04

U.S. Cl. 259—6 **13 Claims**



1. In a mixing apparatus for granular material, in combination, an elongated mixing trough providing a longitudinal flow path and having a receiving and a discharge end, a pair of parallel companion shafts rotatable in said trough, a plurality

of axially spaced sloping parallel interrupted-elliptical disk-like mixing blades on each shaft, the blades on the two shafts having equal but reverse pitch angles and being disposed in transverse pairs, said blades, in one position of the shafts, projecting predominately laterally in the same direction, the maximum radial projection of the blades from the shaft being slightly less than the distance between said shafts, and means for rotating said shafts in unison and in opposite directions whereby the blades of each pair traverse a common portion of said flow path alternately.

Re. 29,388

GLASS COMPOSITIONS AND FIBERS MADE THEREFROM

Alan W. Atkinson, Rochdale, England, assignor to Turner & Newall Limited, Manchester, England

Original No. 3,969,121, dated July 13, 1976, Ser. No. 647,988, Jan. 9, 1976. Continuation-in-part of Ser. No. 441,984, Feb. 13, 1974, abandoned. Application for reissue Jan. 13, 1977, Ser. No. 759,237

Claims priority, application United Kingdom, Feb. 14, 1973, 7151/73

Int. Cl.[2] **C03C** *13/00, 3/04;* **C04B** *31/06*

U.S. Cl. 106—50 **21 Claims**

1. A glass composition, having improved chemical resistance to alkali attack, consisting essentially of:

from 50 to 75 percent by weight Silica
from 10 to 25 percent by weight R_2O
from [1] *7* to 15 percent by weight Titania
from 1 to 20 percent by weight Zirconia
from 0.8 to 20 percent by weight Rare Earth Oxide
from 0 to 20 percent by weight Boric Oxide
from 0 to 10 percent by weight R[1]O
from 0 to 1 percent by weight Fluorine (as fluoride)
from 0 to 2 percent by weight Al_2O_3
from 0 to 1 percent by weight P_2O_5
from 0 to 1 percent by weight Chlorine (as chloride)

wherein R_2O is selected from the group consisting of Na_2O, K_2O, mixtures thereof, and mixtures thereof containing up to 5% by weight lithium oxide (based on the total weight of the composition) and R[1]O is selected from the group consisting of MgO, CaO, BaO, and SrO, and mixtures of two or more thereof.

Re. 29,389

METHOD OF PREPARING ALUMINUM ORGANOIODIDES

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Original No. 3,856,841, dated Dec. 24, 1974, Ser. No. 345,659, Mar. 28, 1973. Application for reissue Oct. 28, 1975, Ser. No. 626,237

Int. Cl.[2] **C07F** *5/06*

U.S. Cl. 260—448 A **16 Claims**

1. A method of forming an aluminum organoiodide comprising the steps of forming a reactive aluminum by permeating highly pure aluminum in the presence of a hydrogen ion source with another metal having an atomic volume close to that of hydrogen, and subsequently, reacting the reactive aluminum with a combination of iodine and an organic compound selected from the group consisting of [alcohol, ketone, aldehyde, phenol, glycol, and carboxylic acids] *an alcohol, a ketone, an aldehyde and a carboxylic acid* whereby said aluminum organoiodide is formed.

Re. 29,390

ELECTRIC DISCHARGE TUBE, COMPRISING A HIGHLY LOADED ANODE

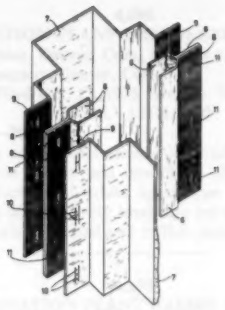
Hendrikus Willemina Evers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Original No. 3,866,076, dated Feb. 11, 1975, Ser. No. 418,583, Nov. 23, 1973. Application for reissue Jan. 12, 1976, Ser. No. 648,309

Claims priority, application Netherlands, Dec. 29, 1972, 7217782

Int. Cl.[2] **H01J** *1/46, 21/10*

U.S. Cl. 313—293 **4 Claims**



1. An electronic tube comprising an anode assembled of at least one inner anode member exposed to a higher thermal load and an outer anode member exposed to a lower thermal load, said inner anode member having surface portions placed against corresponding surface portions of said outer anode member and, at a temperature of about 500 degrees centigrade, said surface portions of the inner anode member having a coefficient of thermal radiation which [exceeds the coefficient of the facing surfaces of the outer anode member by] *is* at least 60 percent *of that of a black body.*

Re. 29,391

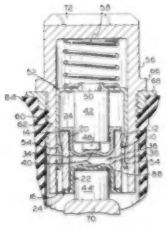
SURGE PROTECTOR ASSEMBLY

Chester J. Kawiecki, Santa Barbara, Calif., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.

Original No. 3,543,207, dated Nov. 24, 1970, Ser. No. 781,134, Dec. 4, 1968. Application for reissue Nov. 20, 1972, Ser. No. 308,294

Int. Cl.[2] **H01H** *79/00;* **H02H** *3/22*

U.S. Cl. 337—28 **15 Claims**



1. A surge protector assembly comprising:

a unitary surge protector including a pair of aligned conductive electrodes each comprising a hollow cylindrical member having a first closed end wall with the opposite end being open and flared to provide an annular flange, and a ceramic spacer cylinder sealed between the flanges of said electrodes for positioning said electrode end walls in facing relation internally of said cylinder forming an arc

discharge gap therebetween, said spacer cylinder forming an enclosure with said electrodes,

elongated contact members within each said hollow cylindrical member and bearing on the inside of the electrode end wall in the direction of the opposite electrode, said contact members each extending outwardly past the electrode's annular flange,

a cylindrical holder within which said protector is received in substantially coaxial relation with respect to said holder, said holder being provided with a spring at one end thereof bringing pressure against one of said contact members urging the same against its corresponding electrode end wall,

and a base member receiving said holder, said base member being provided with means for matingly engaging the exterior of said holder in supporting relation, and for providing outside electrical connection for said contact members.

PLANT PATENTS

GRANTED SEPTEMBER 6, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,097
ST. AUGUSTINE GRASS

Jake T. Gruis, Apopka, Fla.; Terrance P. Riordan, Dublin, and John A. Long, Marysville, both of Ohio, assignors to The O.M. Scott & Sons Company, Marysville, Ohio

Filed Aug. 13, 1976, Ser. No. 714,203
Int. Cl.[2] A01H *5/12*
U.S. Cl. Plt.—88 1 Claim

1. A St. Augustine grass, substantially as herein illustrated and described.

4,098
CARNATION PLANT NAMED MATADOR

David A. Krapes, Arvada, Colo., assignor to Denver Wholesale Florists Company, Denver, Colo.

Filed Oct. 7, 1976, Ser. No. 730,659
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—73 1 Claim

1. A new and distinct variety of carnation plant substantially as herein shown and described, characterized by its distinct high crowned dark red flowers which are borne on long and sturdy stems, its profuse production of blossoms during its blooming period, and by its very small amount of bullheading.

4,099
CARNATION PLANT NAMED GEORGIA ANN

Vincent P. Quinn, Denver, Colo., assignor to Denver Wholesale Florists Company, Denver, Colo.

Filed Oct. 12, 1976, Ser. No. 731,832
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—70 1 Claim

1. The new and distinct variety of carnation plant substantially as herein shown and described, characterized by its profuse production of white spray-type inflorescence, the flowers being of a relatively small size but high centered with alternate whorls of incised and ruffled petals.

4,100
CARNATION PLANT NAMED APACHE

Anthony Euser, Broomfield, Colo., assignor to Denver Wholesale Florists Company, Denver, Colo.

Filed Oct. 12, 1976, Ser. No. 731,833
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—70 1 Claim

1. A new and distinct variety of carnation plant, substantially as herein shown and described, characterized by the randomly variegated purple on white coloration of its flowers, and by the profuse production of spray-type blooms on strong upright stems.

PATENTS

GRANTED SEPTEMBER 6, 1977

ERRATA

For CLASS	See PATENT NO.
361–098	4,045,887
060–521	4,045,978
029–623.1	4,046,062
165–105	4,046,193
206–611	4,046,313
293–088	4,046,411
428–539.5	4,046,517
526–310	4,046,750
544–148	4,046,762
348–339	4,046,773
560–121	4,046,801
560–061	4,046,802
560–172	4,046,803
264–022	4,046,842
264–022	4,046,843
423–239	4,046,888
361–045	4,047,079
363–049	4,047,089
363–034	4,047,090
363–059	4,047,091
363–135	4,047,092
331–016	4,047,121
364–900	4,047,157
364–900	4,047,158
364–900	4,047,159
364–900	4,047,160
364–200	4,047,161
364–200	4,047,162
358–047	4,047,200
364–200	4,047,201
358–029	4,047,202
358–044	4,047,203
358–093	4,047,204
358–107	4,047,205
354–152	4,047,206
354–155	4,047,207
354–203	4,047,208
354–212	4,047,209
354–238	4,047,210
354–258	4,047,211
354–270	4,047,212
354–299	4,047,213
354–155	4,047,222

PATENTS

GRANTED SEPTEMBER 6, 1977

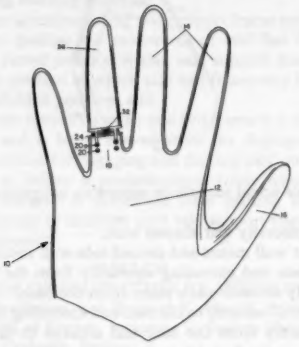
INDEXED

PATENTS

GRANTED SEPTEMBER 6, 1977

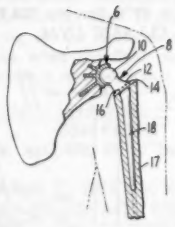
GENERAL AND MECHANICAL

4,045,824
GLOVE FOR RING DISPLAY
Millie T. Weppler, 6324 77th St., Middle Village, N.Y. 11379
Filed June 11, 1976, Ser. No. 695,166
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—163 **5 Claims**



1. A glove comprising a palm portion, a back portion, a plurality of finger stalls and a thumb stall, at least one of said finger stalls being open at the distal end thereof, said open finger stall being of a length short of contacting the knuckles of the finger, a pair of longitudinally spaced apart first and second closure means disposed on the outer surface of said open finger stall, a hollow finger capping member having one closed end and one open end, said member being adapted to receive the finger exposed by said open finger stall, at least one tab member on said capping member, cooperating third closure means on said tab member adapted to engage said first or second means, said capping member contacting and covering the two knuckles on said exposed finger, whereby when said first means is engaged an annular slot is defined between said capping member and said open stall thereby exposing a portion of the finger thereon and thus a ring worn thereon.

4,045,825
HUMERUS PROSTHESIS
Jerome H. Stroot, 2645 Ocean Ave., San Francisco, Calif. 94132
Filed Jan. 28, 1976, Ser. No. 653,277
Int. Cl.[2] A61F *1/24, 1/02, 1/04*
U.S. Cl. 3—1.91 **1 Claim**



1. In a shoulder prosthesis, a humeral component having a superior side when implanted in the humerus bone that faces towards the front side thereof, said humeral component comprising in combination:

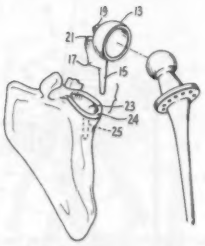
a. a first end terminating in a spherical ball, sized and shaped for fitting in a shoulder socket,

b. a shoulder offset from said ball by about the diameter of the ball, said shoulder having a superior surface lying in the plane of said superior side and including a disclike edge terminating in a substantially flat surface substantially at a right angle to the principal axis of the ball,

c. said shoulder having a plurality of holes adjacent said edge on at least said superior surface thereof, whereby sutures can be passed through said holes to enhance fixation of one or more of the tendons of the rotator cuff, namely supraspinatus, subscapularis, infraspinatus and teres minor tendons to bone and

d. a shaft opposite said first end having a size and shape for attaching said humeral components in the medullary canal of the humerus.

4,045,826
GLENOID COMPONENT FOR SHOULDER PROSTHESIS
Jerome H. Stroot, 2645 Ocean Ave., San Francisco, Calif. 94132
Filed Feb. 9, 1977, Ser. No. 766,878
Int. Cl.[2] A61F *1/24*
U.S. Cl. 3—1.91 **1 Claim**



1. A glenoid component for a shoulder prosthesis comprising:

a. a hemispherical cup;

b. a pin extending outwardly from the outer surface of said cup;

c. a wedge-shaped member extending at right angles to said pin;

d. a pair of reinforcing ribs extending upwardly from the pin and the wedge and being attached to the outer surface of the hemispherical cup;

e. providing a symmetrical glenoid component adapted to be used in either shoulder.

4,045,827
COMBINATION LAVATORY AND TOILET ASSEMBLY
Earl L. Morris, Whittier, and Larry D. Fields, La Puente, both of Calif., assignors to Acorn Engineering Company, Industry, Calif.
Filed Dec. 6, 1976, Ser. No. 747,521
Int. Cl.[2] A47K *4/00*
U.S. Cl. 4—3 **28 Claims**

1. A combination lavatory and toilet assembly, comprising:

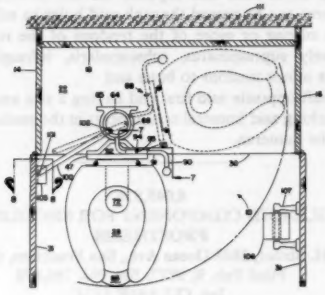
a. an enclosure having a rear side with a plurality of apertures therein, an upper side including means defining a lavatory basin with a drain opening therein and communicable with a plumbing drain pipe, a front side defining an access opening closed by a pivotally mounted closure member;

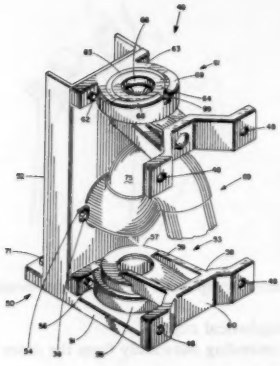
b. a relatively pivotable toilet adapted to be stored in a first position within the enclosure and being pivotable about a

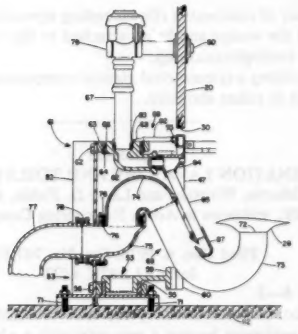
generally vertical axis to a second position disposed exteriorly of the enclosure to permit use thereof;

c. toilet support and pivot means fixedly coupled to the rear portion of the toilet for supporting the toilet independently of the plumbing piping and for pivotal movement between the first and second positions and including:

means for coupling the outlet of the toilet in fluid communication with the plumbing drain; wherein the toilet support and pivot means is independent of the enclosure; and







d. linkage means operatively connected to the closure member and the toilet support and pivot means, whereby when the closure member is moved away from its closure position, the toilet is moved from the first position within the enclosure to a second position disposed exteriorly of the enclosure to permit use thereof when the closure member has been displaced no greater than substantially ninety degrees from its closure position.

4,045,828

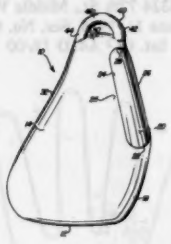
FEMALE URINAL APPARATUS

Emily A. Burnham, P.O. Box 246, Enterprise, Utah 84725

Filed Feb. 6, 1976, Ser. No. 656,065

Int. Cl.[2] A47K *11/00*; A61G *9/00*; E03D *13/00*

U.S. Cl. 4—110 **3 Claims**



1. Female urinal receptacle apparatus, comprising, in combination:

a flat, generally tear shaped base;

first side wall means and second side wall means secured to the base and extending upwardly from the base and inwardly towards each other from the base;

a front wall secured to the base and extending upwardly and forwardly from the base and secured to and extending between the first side wall means and the second side wall means;

a back wall secured to the base and to the first and second side wall means and extending generally upwardly and forwardly from the base;

top means secured to the back wall and to the first and second side wall means;

a vertically elongated opening above the front wall and between the first and second side wall means remote from the back wall and extending upwardly and rearwardly from the front wall to the top means;

transition areas adjacent the opening extending from the opening to the first side wall means and the second side wall means; and

the base, first and second side walls, front wall, back wall, opening, transition areas, and top defining a vertically elongated receptacle having an apex adjacent the front, and increasing in width toward the back to fit the female anatomy, and having a maximum width adjacent the base and a minimum width adjacent the top means to provide stability in use.

4,045,829

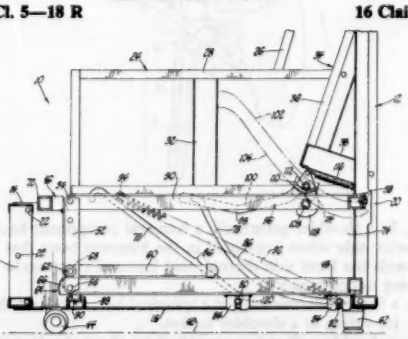
SOFA BED ASSEMBLY

William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed July 26, 1976, Ser. No. 708,912

Int. Cl.[2] A47C *17/14*

U.S. Cl. 5—18 R **16 Claims**



1. A furniture assembly movable between a sitting configuration and a bed configuration comprising:

a support frame;

a foldable bed frame supported by said support frame and movable between a folded and an unfolded position, said bed frame including an inner frame member supported by said support frame and an outer frame member pivotally movable between an extended position wherein it is generally coplanar with respect to said inner frame member and a folded position wherein it is located above said inner frame member, said inner and outer frame members defining a space therebetween when in said folded position for containing bedding material;

guide means interconnecting said support frame and said bed frame for guiding the movement of said bed frame between a stored position within said support frame and a deployed position in which said bed frame may be moved to the unfolded position; and

closure means operative when said bed frame is in the folded position and is being moved from the deployed to the stored position for engaging and forcing said outer frame member to follow a predetermined route whereby said bedding material is prevented from causing said outer frame member to interfere with said support frame during such movement.

4,045,830

SYSTEM OF PROTECTION BY MODELING

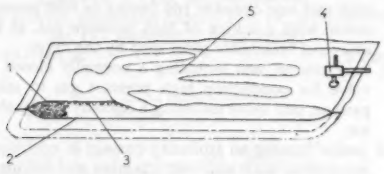
Jean Loeb, Strasbourg, and Bernard E. Plantif, Saint Medard Enjalles, both of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Mar. 24, 1975, Ser. No. 561,029

Claims priority, application France, Mar. 27, 1974, 74.10536

Int. Cl.[2] A47C *4/54*; A61G *7/08*; A47C *7/14*

U.S. Cl. 5—81 R **13 Claims**



5. A system of protection by modeling or immobilization or both hich comprises at least one flexible and leakproof envelope, a plurality of resilient and deformable bodies within said envelope, means permitting to create a vacuum inside said envelope, said envelope consisting of two separate, elastic skins, joined together so as to insure the leakproofness of said envelope; said means permitting to create a vacuum comprising a gas generator, a pump placed downstream of said generator, the pump having an ejector, said generator communicating with the ejector of said pump, a suction orifice in said envelope in communication with the collector of said pump through a non-return valve, wherein each envelope is equipped with means for breaking up the imbrication of said resilient and deformable bodies when the fluid pressure which prevails outside said envelope is restored inside the envelope.

4,045,831

BED SHEET

William F. Clark, Apt. 202, 49051 Denton Road, Belleville, Mich. 48111

Filed Sept. 17, 1975, Ser. No. 614,344

Int. Cl.[2] A47G *9/00*

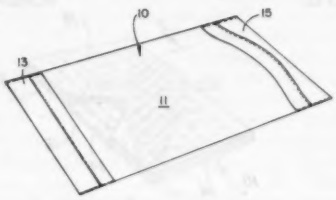
U.S. Cl. 5—334 R **1 Claim**

1. An improved bedsheet for covering a mattress comprising:

a fabric panel which is substantially the same length as said mattress, substantially the same width as the blanket to be used with said sheet and substantially wider than said mattress,

a pair of facing, open pockets at opposite ends of said fabric panel, each of said pockets being deep and wide enough to receive an end of the flattened blanket to be used with said sheet,

one of said pockets being capable of being adapted to enclose the foot portion of said mattress and the other of said pockets being capable of receiving and enclosing the head



portion of said blanket such that movement of a sleeping person is insufficient to pull the blanket out of the pocket thereby preventing said person from coming into contact with the blanket.

4,045,832

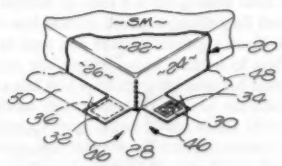
FITTED SHEET CONSTRUCTION

Paula Anne DiForti, and Thomas DiForti, both of 20892 Queens Park Lane, Huntington Beach, Calif. 92646

Continuation-in-part of Ser. No. 522,376, Nov. 8, 1974, abandoned. This application May 13, 1976, Ser. No. 686,444

Int. Cl.[2] A47G *9/00*

U.S. Cl. 5—334 C **11 Claims**



1. A fitted sheet of material adapted to cover a cushion, said sheet comprising:

a sheet of material having at least an upper panel and at least two side panels, said upper panel and side panels being adapted to cover portions of the upper surface and portions of adjacent side surfaces of said cushion, respectively, when said sheet of material is fitted over said cushion;

said sheet of material having a cut out portion which allows movement of a lower portion of the cushion through the cut out portion; and

means mounted on the sheet of material adapted to removably connect said upper and side panels around said cushion lower portion, at least a portion of said securing means being adapted to pass under said cushion lower portion when said sheet of material is fitted on said cushion and to connect said side panels together to maintain said side panels in substantially fixed relationship to each other so that said sheet of material follows the natural contour of said cushion, whereby said sheet of material is maintained in position on said cushion.

4,045,833

ABSORBENT BED PAD

Frederick K. Mesek, Downers Grove, and Virginia L. Repke, Oak Forest, both of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.

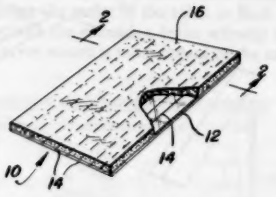
Continuation of Ser. No. 386,114, Aug. 6, 1973, abandoned. This application May 30, 1975, Ser. No. 582,479

Int. Cl.[2] A61F *13/16*

U.S. Cl. 5—335 **12 Claims**

1. An absorbent pad comprising: a through-bonded, nonwoven fabric having given overall concentration of long fibers and short fibers, said fabric being enriched in long fibers in excess of said given overall concentration at one face and being

enriched in short fibers in excess of said given overall concentration at the other face, and having a transition of fiber concentration between said faces; and a liquid-impervious backing sheet adhered to said short fiber-enriched face throughout the



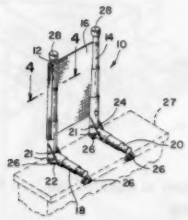
interface therebetween, said fabric face enriched in long fibers being an outermost face of said absorbent pad, said fabric face enriched in long fibers being an outermost face of said absorbent pad.

4,045,834

BACK-REST ATTACHMENT

David R. Mason, 4162 Dearborn St., East Chicago, Ind. 46312

Filed Sept. 8, 1976, Ser. No. 721,359
Int. Cl.² B63B *29/00*
U.S. Cl. 9—7 1 Claim



1. A back-rest attachment for a boat seat comprising:

first and second rods substantially disposed in a first plane and spaced from, and co-extensive with one another, each of said rods having first and second ends, respectively;

a fabric disposed between said first and second rods, and attached thereto;

third and fourth rods substantially disposed in a second plane and co-extensive with one another, having third and fourth ends, respectively, said third ends of said third and fourth rods being pivotably attachable to said first ends of said first and second rods, respectively, for said second plane to subtend a range of angles from approximately 0° to 90°;

first and second hinges connectable to said first and third, and said second and fourth rods, respectively, having snap-in means for holding said third and fourth rods in stabilized first and second positions, said second plane being substantially parallel with said first plane in said first position, and substantially perpendicular thereto in said second position; and

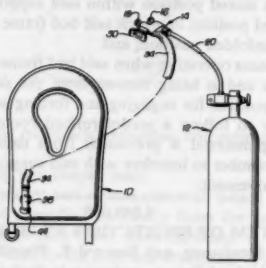
clip means attachable to said third and fourth rods for clipping the back-rest attachment to a board or the like. and wherein each of said rods is telescopically collapsible for said backrest attachment to be foldable into a collapsed position, and the folded fabric to be usable as a handle, and further comprising first and second caps attachable to said second ends of said first and second rods, respectively, and wherein each of said rods has selectable extended and collapsed positions and including snap-in means for keeping each of said rods in the selected position of said extended and collapsed positions.

4,045,835

POWER DEFLATOR MECHANISM FOR SCUBA BUOYANCY VESTS

Fred Flam, Los Angeles, and Dennis L. Hart, Hacienda Heights, both of Calif., assignors to Under Sea Industries, Inc., Compton, Calif.

Filed Aug. 30, 1976, Ser. No. 718,908
Int. Cl.² B63C *9/24*
U.S. Cl. 9—313 9 Claims



1. In a buoyancy control apparatus for a scuba diver:

a. a buoyancy vest having an inflatable and deflatable chamber;

b. a control unit having a supply passage in communication with said vest chamber and having an inlet passage cooperable with a source of high pressure gas, as from the source of breathable gases used by the diver;

c. said control unit including a normally closed inflation valve for conducting high pressure gas to said supply passage, said valve including a digitally engageable actuator;

d. means forming an aspirating passage in continuous communication with said vest chamber and having an inlet side and an outlet side on opposite sides of a restriction;

e. means forming a jet at the inlet side of said aspirating passage;

f. a normally closed valve at the outlet side of said aspirating passage;

g. said control unit including a normally closed deflation valve for conducting air from said supply passage to the ambient, said deflation valve including another digitally engageable actuator;

h. aspirating valve means operable only upon extended movement of said deflation valve actuator for supplying said jet with a stream of high pressure air.

4,045,836

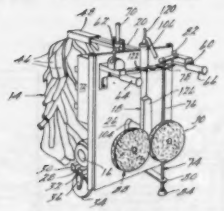
AUTOMOBILE POLISHING APPARATUS

Robert M. Glenn, 1410 Clarendon, Bloomfield Hills, Mich. 48013

Filed Jan. 29, 1976, Ser. No. 653,633
Int. Cl.² B60S *3/06*
U.S. Cl. 15—4 9 Claims

1. Automobile polishing apparatus comprising a main frame, wheel mounted on the frame supporting it for rolling movement about the automobile, a large polishing wheel mounted on the frame for rotation about a vertical axis and adapted to polish the side panels and the front and rear of the automobile, portable rotatable polishing means mounted on said frame and adapted to be hand-held for use in polishing the upper surfaces of the automobile including the top, the hood and the deck, means mounted on said main frame for rotating said polishing wheel and means connected to said polishing means for rotating it, wherein said means mounted on said main frame and said

last named means each include an electric motor, a first electric switch for controlling the supply of electric power to said motor of said means mounted on said main frame, a second electric switch for controlling the supply of electric power to the electric motor of the last named means, common means for supply electric power to both of said switches including elec-



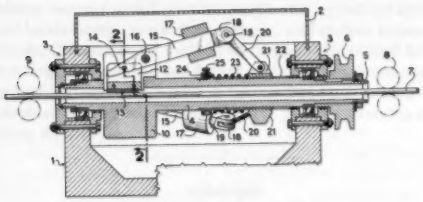
tric cord means for connection to a suitable source of external power, a vertically disposed rotatable shaft having ring contacts connected to said electric cord means, and brush contacts connected to said switches whereby said cord means will not become twisted in moving the polishing apparatus around automobiles in the polishing thereof.

4,045,837

MACHINE FOR POLISHING RODS OR WIRES

Christian Maurice Mandras, Revigny-sur-Ornain, France, assignor to Societe Metallurgique de Revigny, Revigny-sur-Ornain, France

Filed Feb. 2, 1976, Ser. No. 654,498
Claims priority, application France, Feb. 13, 1975, 75.04450
Int. Cl.[2] B08B *9/02*; B24B *39/04*
U.S. Cl. 15—104.04 **9 Claims**



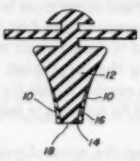
1. A machine for polishing non-rotating rods or wires of metal, comprising in combination: a fixed frame, a hollow tubular element which is mounted to be rotatable in the frame and defining a bore for receiving the rod to be polished, which rod extends coaxially inside the element for axial movement through the element, pressure-applying means actuatable by centrifugal force and mounted on the tubular element, radially movable polishing means carried by the pressure-applying means to be radially applicable against the rod by the pressure-applying means, and means for driving the tubular element and the pressure-applying means in rotation, the pressure-applying means comprising a support mounted on the tubular element to rotate with the tubular element but to be axially movable relative to the tubular element, a plurality of first links equally spaced apart angularly about the tubular element, a pivot pin pivotably mounting each first link on the tubular element, the polishing means being pivotably mounted on each first link on one side of the pivot pin, a slidable weight carried by each first link on an opposite side of the pivot pin to said polishing means and as many second links as there are first links and respectively associated with said first links, each second link having one end portion pivoted to the support and an opposite end portion pivoted to a respective one of said first links on said opposite side of the pivot pin.

4,045,838

SURFACE LAYER FOR WINDSHIELD WIPER BLADES

Raymond P. Porter, North Dartmouth, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Mar. 15, 1976, Ser. No. 667,163
Int. Cl.[2] B60S *1/38*
U.S. Cl. 15—250.36 **23 Claims**



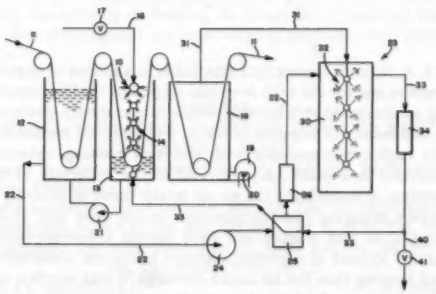
1. A flexible windshield wiper blade, the basic blade of which has a coefficient of friction on at least the sides of the lip of the blade of no greater than about 2.1 according to Friction Test CFRP 113, said basic blade being selected from the group consisting of those blades which inherently have a coefficient of friction of no greater than about 2.1, those blades which have a coefficient of friction above 2.1 and which have been treated to reduce their coefficient of friction so that it is no greater than 2.1, and those blades which have a coefficient of friction above 2.1 which have been coated to reduce their coefficient of friction so that it is no greater than 2.1, at least one coating on said sides of the lip extending all the way to the lip edge, said at least one coating having a coefficient of friction greater than the coefficient of friction of said surface of said basic blade and said coating being selected from the group consisting of those elastomeric and plastic materials having a Young's modulus of from about 10^6 to about 10^{11} dynes/cm^2, said coating being of a thickness effective to reduce the number of streaks the coated blade will give in Wipe Test WT-1 as compared to the number of streaks given by said basic blade.

4,045,839

APPARATUS FOR RECYCLING PHOTOGRAPHIC WASH WATER

Harry N. Parsonage, Dayton, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 462,884, April 22, 1974, Pat. No. 3,997,347. This application Sept. 30, 1976, Ser. No. 728,166
Int. Cl.[2] G03D *3/02*
U.S. Cl. 15—302 **3 Claims**



3. Apparatus for washing film developed by a photographic process comprising:

a. A first means, including a tank means for holding recycled wash water, for rinsing said film by immersing said film in said water,

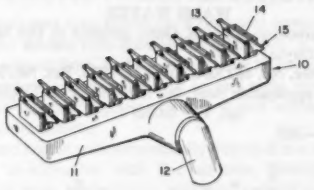
b. A second means for rinsing said film by spraying recycled wash water on said film,
c. A third means for rinsing said film by spraying fresh, relatively uncontaminated, un-recycled water on said film,
d. A means for drying said film to remove any moisture on said rinsed film,
e. Means for collecting the spent rinse water from said second and third rinsing means,
f. Means for passing said spent rinse water from said second and third rinsing means to said first rinsing tank means for inclusion with said recycled wash water,
g. Means for passing the spent wash water from said first rinsing means to a reactor means for oxidizing the thiosulfate salts from said fix solution in said spent wash water to sulfate salts,
h. Means for passing the spent dryer air from said dryer means to said reactor means,
i. Reactor means comprising a reaction vessel and carbon particles having surface portions in contact with polytetrafluoroethylene resin without being completely encapsulated by said resin for reacting the thiosulfates in said spent wash water and the oxygen in said spent dryer air in the presence of said carbon particles to convert said thiosulfates to sulfates and to convert said spent wash water to sulfate water to be recycled, and
j. Means for passing said recycled water back to said second rinsing means for reuse as recycled wash water.

4,045,840

VACUUM CLEANER TOOL FOR CLEANING DEEP PILE CARPETS

Erik Karl Gustav Johansson, Sollentuna, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed July 28, 1975, Ser. No. 599,594
Claims priority, application Sweden, Aug. 28, 1974, 7410912
Int. Cl.² A47L 9/06
U.S. Cl. 15—397 **7 Claims**



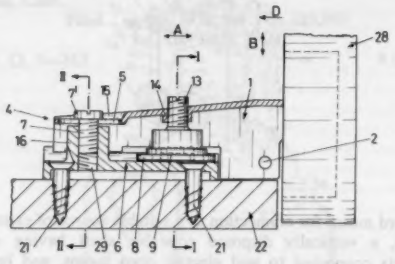
1. A vacuum cleaner tool attachable to a source of negative pressure and for use with deep pile carpets or the like comprising an elongated tool housing which is operatively connected to said source of negative pressure, a plurality of suction nozzles each communicating with said tool housing, extending generally in a plane perpendicular to the underside of said housing, a terminating on an air intake opening plurality of surface engaging runners provided on the same side of said housing as said nozzles and each having a bottom surface thereof located at a greater distance below the underside of said housing than the air intake openings of said nozzles, each of said runners bridging a respective suction nozzle and disposed in a plane that is generally perpendicular to the length direction of said tool housing, and each of said runners dividing the respective suction nozzles in substantially equal sections whereby said runners slide in the direction of movement of said tool on the carpet work surface raising the pile and improving dirt removal from the interior of said carpet.

4,045,841

HINGE

Erich Röck, Kuferstrasse 1085, A-6973 Hochst, and Bernhard Mages, Harte 10, A-6850 Dornbirn, both of Austria

Filed Apr. 5, 1976, Ser. No. 673,893
Claims priority, application Austria, Apr. 7, 1975, 2623/75; Dec. 2, 1975, 9174/75
Int. Cl.² E05D 7/04
U.S. Cl. 16—129 **18 Claims**



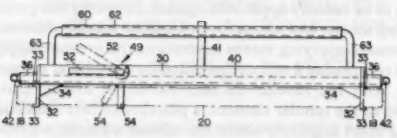
1. A hinge arrangement comprising, in combination, a base plate attachable to furniture means; a hinge arm carrying toggle joint means and being anchorable in said base plate; said toggle joint means having pivot means; said hinge arm having means for mounting said pivot means at one end of said hinge arm; said hinge arm having a longitudinal slot at another end of said hinge arm spaced from said mounting means for said pivot means of said toggle joint means; screw means passing through said slot and carried in said base plate; said hinge arm including a holding shoulder between said longitudinal slot and said mounting means for said pivot means; projecting means on said base plate, said holding shoulder gripping behind said projection means on said base plate.

4,045,842

DETACHABLE HANDLE FOR AIDING IN THE MANIPULATION OF TRANSPORT CARTS

Roland Theriault, 123 Babbs Road, West Suffield, Conn. 06093

Filed Aug. 13, 1976, Ser. No. 714,105
Int. Cl.² B60D 3/00
U.S. Cl. 16—114 R **5 Claims**



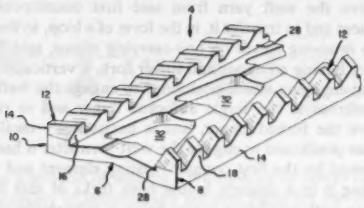
1. In a detachable handle for a transport cart of the type having upstanding end members with vertical corner legs having horizontal cross members extending therebetween, the combination of: a main support bar, inboard and outboard clamps projecting outwardly from the ends of the support bar for gripping the vertical corner legs of the transport cart, and bearing means projecting outwardly relative to the main support bar for gripping a selected one of the cross members.

4,045,843

BUNDLE TIE DEVICES AND MATERIAL

Winfield Warren Loose, Linglestown, and Anthony Francis Thomas, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sept. 1, 1976, Ser. No. 719,641
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 PB **10 Claims**



1. A continuous length of bundle tie material comprising:

a continuous strip of plastic material having parallel side edges,

said strip having holes therein at evenly spaced intervals, said holes being centrally located mid-way between said side edges and being symmetrical with respect to the longitudinal axis of said strip,

one surface of said strip having thereon two bands of relatively fine ratchet teeth, each band extending along one of said side edges,

said holes being sufficiently large to permit passage therethrough of an end portion of said strip which has been folded along said longitudinal axis with said bands facing outwardly of the folded end portion whereby,

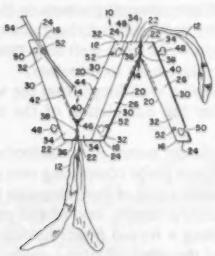
a section of said strip can be used as a bundle tie device by folding one end of said section along said longitudinal axis with said bands facing outwardly, wrapping said section around said bundle, threading said folded end through one of said holes in said strip, and pulling said folded end until said bundle is held by said section, said relatively fine ratchet teeth in said bands cooperating with edges of said hole to provide a ratchet mechanism for said tie.

4,045,844

SOCK LOCK DEVICE

David P. Murray, 53 George St., Watertown, Mass. 02172

Filed June 2, 1976, Ser. No. 692,093
Int. Cl.² A44B *21/00*
U.S. Cl. 24—81 DM **4 Claims**



1. A sock lock device adapted to maintain at least two pairs of socks together during a washing and a drying operation on a clothesline, which comprises:

a. at least two clothespin elements, each said clothespin element adapted to receive one said pair of socks therein and including a pair of arms, each said arm having a jaw end and a handle end;

b. means for detachably joining said clothespin elements; and

c. means for hanging said lock device from said clothesline, said detachably joining means further comprising:

d. a snap element mounted on each said arm at said jaw end; and

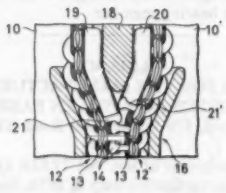
e. a snap receiving element embedded in each said arm at said handle end for receiving one said snap element therein.

4,045,845

TOP STOP DEVICE FOR SLIDE FASTENERS

Akiyoshi Kando, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Oct. 1, 1975, Ser. No. 618,626
Claims priority, application Japan, Oct. 14, 1974, 49-123746[U]
Int. Cl.² A44B *19/36*
U.S. Cl. 24—205.11 F **3 Claims**



1. In a slide fastener of the type including a pair of stringer tapes carrying along their opposed inner edges respective rows of continuous coupling elements which are mutually engageable and disengageable by a slider moving therealong, each row of coupling elements being formed with a plurality of scoops each having a head projecting inwardly beyond the inner edge of one of the stringer tapes, a top stop device comprising, in combination, a pair of stop members of a synthetic resin each united with one of said rows of coupling elements so as to cover at least the head regions of several topmost scoops thereof, each said stop member projecting inwardly beyond the inner edge of one of said stringer tapes substantially to the same extent as said heads of the scoops carried thereby, one of said stop members being shorter than the other stop member and at least the end of said shorter stop member being disposed in direct contact with one of the underlying scoops whereby, upon movement of said slider along said rows of coupling elements to a predetermined topmost position thereon, the scoop immediately underlying the lower end of said one stop member abuts against the inner edge of said other stop member.

4,045,846

FOLDED TAPE SLIDE FASTENER STRINGER WITH EXTERNAL CORD

George B. Moertel, Conneautville, Pa., assignor to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 648,428, Jan. 12, 1976, and a continuation-in-part of Ser. No. 539,642, Jan. 9, 1975, Pat. No. 3,975,802. This application July 19, 1976, Ser. No. 706,351
Int. Cl.² A44B *19/40, 19/12*
U.S. Cl. 24—205.16 C **9 Claims**

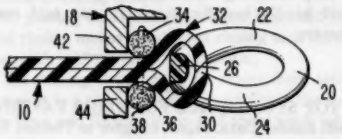
1. A stringer for a slide fastener comprising

a support tape formed from a longitudinally folded strip defining a folded edge and having opposite folded portions which extend from the folded edge and are secured together,

said support tape having a plurality of spaced slits formed in the strip transversely over the folded edge and defining

strap portions extending over the folded edge between the slits,

a continuous coupling element having a plurality of successive sections each including a head portion extending from a respective slit of the plurality of slits and including an interconnecting portion which is joined with an adjoining



section and extends within the folded edge beneath a respective one of the strap portions,

said continuous coupling element having a thickness to form a bead in the folded edge of the tape, and

cord means secured to the outside of the support tape and extending longitudinally alongside the bead to form a slider flange bearing member.

4,045,847

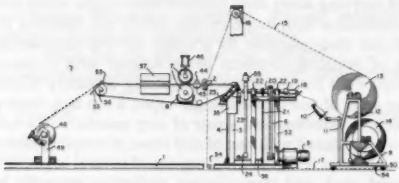
APPARATUS FOR THE MANUFACTURE OF WEFT INSERTED NON-WOVEN FABRICS

Richard L. Walford, 576 Walnut Hill Road, Thomaston, Conn. 06787

Continuation-in-part of Ser. No. 77,514, Oct. 2, 1970, abandoned. This application July 3, 1974, Ser. No. 485,490

Int. Cl.[2] D04H *3/04*

U.S. Cl. 28—101 **8 Claims**



1. In an apparatus for forming fabric of the warp and cross laid weft type, which apparatus includes means for supplying warp yarns in the form of at least one sheet and means for forming aligned wefts and transporting them to lay across the warps, the improvement which comprises,

a. the means for forming and transporting aligned wefts comprising two aligned weft carrying means for carrying aligned wefts, said carrying means being provided with weft loop retaining means, the spacing of the weft loop retaining means being shorter than the dimension of the means, a source of at least one weft yarn, means for stringing weft yarn from weft loop retaining means on one carrying means to weft loop retaining means on the other carrying means and means guiding weft yarn from said source to said stringing means,

b. said means for stringing weft yarn comprising at least one yarn guide and means for moving said yarn guide along the periphery of a circular arc, the chord of said arc being substantially equal to the length of a weft, one end of said chord being adjacent to one weft carrying means and the other end adjacent to the other weft carrying means,

c. moving transfer means for transferring loops of weft yarn from the guide moving along the periphery of the circular arc to the weft loop retaining means on the weft carrying means, whereby movement of the guide means along the circular arc lays wefts from weft loop retaining means on one weft carrying means to the other,

d. means for releasing weft loops from the weft loop retaining means after the completion of the transport of the aligned wefts,

e. the moving transfer means for laying wefts onto the weft carrying means comprising a pair of counter-rotating elements adjacent each weft carrying means, the first of such elements of the first of the pairs thereof being a single unforked finger positioned to receive weft yarn from the end of the yarn guide means, the second counter-rotating element of the first pair being a forked finger positioned to receive the weft yarn from said first counter-rotating element and to transfer it, in the form of a loop, to the weft loop retaining means on one carrying means, said forked finger having an upper and lower fork, a vertically oscillating engaging means positioned to engage the weft yarn transferred to the single unforked finger and to raise it above the forked finger, and a horizontally oscillating means positioned to engage the weft yarn after it has been received by the first counter-rotating element and maintaining it in a position below both forks of said forked finger, both oscillating means being synchronized to hold the yarn during transfer from the first counter-rotating element to the second counter-rotating element, whereby coaction of the two oscillating engaging means and the counter-rotating elements results in a twisted loop around the first counter-rotating element, which loop, when transferred to the second counter-rotating element and from said second counter-rotating element to the weft loop retaining means, effecting a half twist of the yarn, and

f. all of the means effecting motions being synchronized.

7. In an apparatus for forming fabric of the warp and cross laid weft type, which apparatus includes means for supplying warp yarns in the form of at least one sheet and means for forming aligned wefts and transporting them to lay across the warps, the improvement which comprises,

a. the means for forming and transporting aligned wefts comprising two aligned weft carrying means for carrying alinged wefts, said carrying means being provided with weft loop retaining means, the spacing of the weft loop retaining means being shorter than the dimension of the means, a source of at least one weft yarn, means for stringing weft yarn from weft loop retaining means on one carrying means to weft loop retaining means on the other carrying means and means guiding weft yarn from said source to said stringing means,

b. said means for stringing weft yarn comprising at least one yarn guide and means for moving said yarn guide along the periphery of a circular arc, the chord of said arc being substantially equal to the length of a weft, one end of said chord being adjacent to one weft carrying means and the other end adjacent to the other weft carrying means,

c. moving transfer means for transferring loops of weft yarn from the guide moving along the periphery of the circular arc to the weft loop retaining means on the weft carrying means, whereby movement of the guide means along the circular arc lays wefts from weft loop retaining means on one weft carrying means to the other,

d. means for releasing weft loops from the weft loop retaining means after the completion of the transport of the aligned wefts,

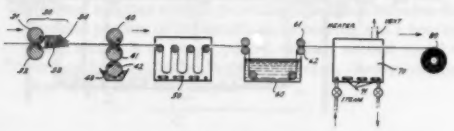
e. the moving transfer means for transferring loops of weft yarn from the yarn guide comprising two pairs of counter-rotating elements, a pair of such elements located adjacent each weft carrying means, one of the pairs of such elements comprising a forked finger having an upper and a lower fork and the other counter-rotating element of such one pair being a double hooked finger positioned to receive weft yarn from the yarn guide end, the hooks being positioned one above the upper fork of the forked finger and one below the lower fork, whereby the second pair of counter-rotating elements transfers a loop of weft yarn to the weft loop retaining means without twisting said loop and thus without forming a half twist in the weft.

4,045,848

METHOD OF PRODUCING A WARP OF INTERMITTENTLY COLORED YARNS

Ralph Whitaker, Bala-Cynwyd, Pa., assignor to Fred Whitaker Company, Bala-Cynwyd, Pa.

Continuation of Ser. No. 622,016, Oct. 14, 1975, abandoned.
This application Sept. 17, 1976, Ser. No. 724,335
Int. Cl.[2] D02G 1/00
U.S. Cl. 28—218 3 Claims



1. In a method of making a multiplicity of warps composed of a plurality of substantially parallel yarns for use in making carpets of a preselected pattern, the steps which comprise:

a. forming the yarns into warps;

b. weaving each of said warps with a sacrificial filling yarn to produce woven prefabrics, said sacrificial yarn being subject to decomposition or dissolution in a concentrated solution of a chemical;

c. forming a multiplicity of crimps in each of said prefabrics;

d. dyeing each of said woven prefabrics with predetermined patterns that are correlated with the desired pattern of the final carpet product in different colors in localized areas so that the localized areas along the lengths of the yarn are dyed in different colors, heat setting each prefabric after dyeing;

e. intimately contacting each prefabric with a dilute aqueous solution of said predetermined chemical;

f. heating and drying each prefabric so as to concentrate said solution to substantially decompose or dissolve said filling yarn without substantially attacking said warp yarns or said dye, completing the drying of said yarns;

g. taking up each of the resulting selectively locally dyed warp yarns as a warp;

h. matching up the warps into the desired pattern of the final product, and

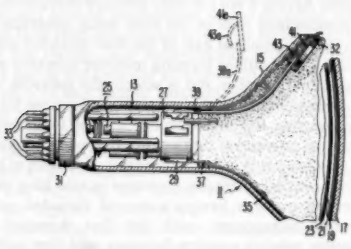
i. feeding each warp resulting into a fabricating machine to form the final carpet product with the preselected pattern.

4,045,849

METHOD FOR ASSEMBLING A THERMALLY-SET GETTER SPRING IN A CRT

Earle Solomon Thall, Leola, Pa., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 608,563, Aug. 28, 1975, Pat. No. 4,006,381.
This application Oct. 21, 1976, Ser. No. 734,413
Int. Cl.[2] H01J 9/00
U.S. Cl. 29—25.13 5 Claims



1. In a method for assembling a cathode-ray tube including an envelope, a mount assembly within said envelope and a getter container supported on a spring connected to and extending from said mount assembly, the steps comprising

a. providing a spring at least a portion of which has been thermally set to a first shape and then cold formed to a second shape different from said first shape, said portion being of an alloy which restores itself to said first shape upon heating above a predetermined transition temperature,

b. attaching said container to said spring,

c. attaching said spring to said mount assembly,

d. sealing said container and mount assembly in said envelope

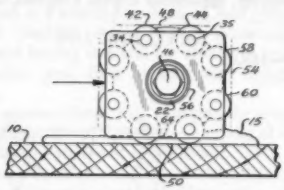
e. and then heating said spring above said predetermined transition temperature until said spring is restored to said first shape.

4,045,850

ROLLING PIN WITH DOUGH THICKNESS CONTROL

Guenther Brandes, 3 Wilson Ave., Camden, Maine 04843

Filed Dec. 15, 1975, Ser. No. 640,755
Int. Cl.[2] B05C 1/08
U.S. Cl. 29—111 4 Claims



1. A pin for rolling dough flat including means for operation thereof comprising axially and rotatably on each end of the cylinder, gauge means rotatable around the axis of the cylinder and mounted adjacent each end of the cylinder, and having a peripheral portion spaced laterally from the axis of the cylinder, and rotatable means

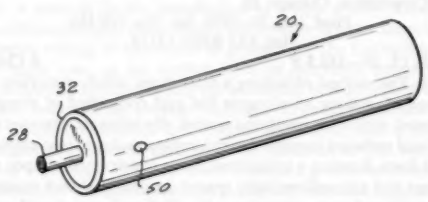
comprising two spaced plates having a circular bearing mounted eccentrically with respect to the major axis, and a pair of like diameter rollers mounted adjacent at least one edge with their axes parallel to the major axis and their engaging surfaces equally spaced from the plates.

4,045,851

METHOD OF FABRICATION OF HOLLOW FILAMENT SEPARATORY MODULE

Edward Ashare, Framingham; Richard N. Rulison, Medfield; Lawrence T. Wright, Whitman, and Myron J. Coplan, Natick, all of Mass., assignors to Albany International Corporation, Albany, N.Y.

Filed Sept. 20, 1974, Ser. No. 507,714
Int. Cl.[2] B01D 31/00
U.S. Cl. 29—157 R 5 Claims



1. The method of producing a hollow filament separatory module including the steps of winding a plurality of layers of

semi-permeable hollow filaments on a removable cylindrical support to create an annulus of filaments, each of said layers being helically wound at an angle to the axis of the winding support with adjacent layers wound in opposite hand, removing the cylindrical support, extending the annular filament array parallel to the axial direction by application of force to substantially increase the length in the order of up to five times the original length while decreasing the diameter of the annulus and decreasing the helix angle imparted to the wound filaments during the winding by a similar multiple, opening ends of filaments of the annulus and isolating said open ends from the main portions of the filaments, and providing a first means for allowing fluid to flow in contact with the outer surfaces of said filaments at the main portions thereof and providing a second means to allow fluid to flow within said hollow filaments and through the open ends thereof.

4,045,852

WHEEL TRUING MACHINE

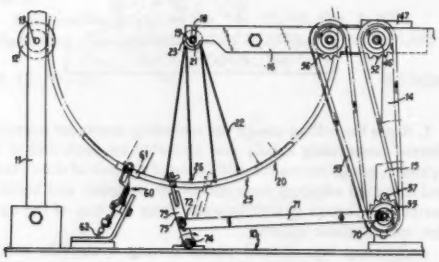
Andrew Gordon Winch, Nottingham, England, assignor to Raleigh Industries Limited, Nottingham, England

Filed July 22, 1975, Ser. No. 598,038

Claims priority, application United Kingdom, July 24, 1974, 32595/74

Int. Cl.[2] B21K *1/34*

U.S. Cl. 29—159.02 **10 Claims**



1. A method of truing a newly built spoked wheel having a hub and rim, subsequent to fitting spokes to the wheel and loosely screwing nipples to the spokes at the wheel rim comprising the steps of securing the rim and hub in a concentric relationship, locally depressing the rim relative to the hub to a datum radius in the region of a nipple, tightening said nipple at least partially, and further locally depressing said rim relative to said hub in the region of each of said remaining nipples until all of said nipples are tightened as desired.

4,045,853

METHOD OF MANUFACTURING FILTER DRUMS

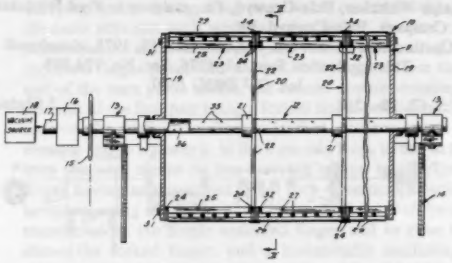
Harold R. White, New Lenox, Ill., assignor to Alar Engineering Corporation, Chicago, Ill.

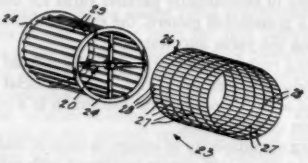
Filed Aug. 31, 1976, Ser. No. 719,164

Int. Cl.[2] B23P *15/16*

U.S. Cl. 29—163.5 F **8 Claims**

1. The method of making a filter drum which comprises the steps of, making an elongate flat grid comprised of elongate spaced rods with overlying spaced ribs arranged transversely of said rods and secured thereto, rolling said grid into cylindrical form, forming a cylindrical frame constructed of open end rings and circumferentially spaced longitudinal bars connecting said end rings, wrapping said rolled grid around said cylindrical frame with the grid rods overlying the frame bars, joining opposed ends of the wrapped grid, securing a plurality of said grid wrapped cylindrical frames in end to end relation around a through axle by means of spiders on the axle secured to the frame end rings, mounting end heads on end portions of





the through axle, and securing the end heads to the opposite ends of the assembled cylindrical frames.

4,045,854

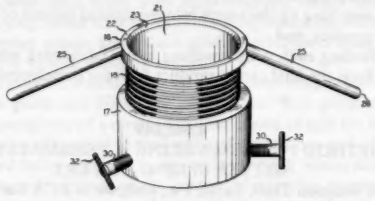
DEVICE FOR INSTALLATION OF PLASTIC FIFTH WHEEL LINER ON A TRUCK TRAILER

David C. Burton, Williamstown, Ky., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 24, 1976, Ser. No. 699,730

Int. Cl.[2] B23P *17/02*

U.S. Cl. 29—235 **2 Claims**



1. An apparatus for installing a fifth wheel bearing liner and retaining keeper on a king pin of a trailer, said apparatus comprising:

a. a first member having a first threaded portion, said first member having a bore at least partially therethrough with the longitudinal axes of the bore being generally coaxial with the longitudinal axis of the first threaded portion;

b. at least one shoulder forming member movably mounted on said first member and is selectively movable into and out of engagement with a portion of a king pin for removably securing the first member against longitudinal and rotational movement on the king pin, said shoulder forming member being selectively engageable with at least one surface partially defining a groove in said king pin;

c. a second member having a second threaded portion in threaded engagement with the first threaded portion whereby relative rotation between said first and second members effects extension and retraction of the assembly thereof, said second member having a through bore generally coaxial with the second threaded portion, said second

member has a surface on a free end thereof adapted for engagement with a keeper to be installed on the king pin and has a recess surrounding said second member bore and recessed in said second member surface for providing clearance for a portion of said keeper during installation thereof; and

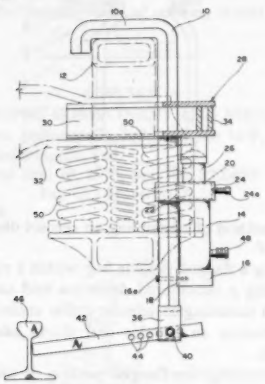
d. a handle secured to and extending outwardly from said second member and having a free end portion, said free end portion of the handle is spaced below said second member surface providing clearance between the handle free end member surface providing clearance between the free end portion of the handle and a bearing and a bearing liner, which is to be supported on said second member surface for installation with said keeper, during installation of the liner and keeper.

4,045,855

TRUCK BOLSTER LIFTING DEVICE

Anthony Richard Kruk, Winnipeg; Richard Bryant, Montreal, and Samuel Harper, Winnipeg, all of Canada, assignors to Canadian Pacific Limited, Montreal, Canada

Filed Sept. 24, 1975, Ser. No. 616,269
Int. Cl.² B23P *19/02*; B66F *7/26*
U.S. Cl. 29—252 **2 Claims**



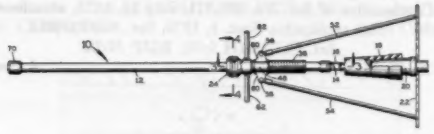
1. An apparatus for use in replacing the bolster-supporting springs between a truck and a bolster of a railway car, the railway car being positioned on a track, said apparatus comprising a pair of hanger bars laterally spaced apart to provide access therebetween to the bolster-supporting springs when the apparatus is in use on a railway car, first engagement means in the form of hooks on the upper ends of said hanger bars to engage an upper part of the truck, second engagement means comprising a member slidably mounted on said hanger bars to maintain their lateral spacing, and having a portion insertable into the end of the bolster so as to engage the bolster, hydraulically actuated means connected at one end to said hanger bars and at the other end to each second engagement means to urge said first and second engagement means together when actuated, and thus raise said bolster to permit removal and replacement of the springs, said hydraulically actuated means comprising a piston and cylinder arrangement mounted at its lower end on each of said hanger bars and engaging said member at its upper end, a pair of unitary, rigid support bars and means for mounting said support bars on the lower ends of said hanger bars such that each support bar extends into engagement with a rail of the track on which the railway car is positioned, and supports the lower end of the corresponding hanger bar against movement in the direction of said rail, thereby preventing the truck from rolling about a longitudinal axis when the bolster is raised, said support bar mounting means comprising a mounting bracket mounted on the lower end of each hanger bar, means for pivotably connecting each of said support bars to the corresponding bracket, and aperture means cooperating with said connecting means for adjustably mounting each of said support bars at different spaced positions relative to the corresponding hanger bar.

4,045,856

PULLING TOOL

John E. Sneed, 4522 SW. 54th St., Fort Lauderdale, Fla. 33314

Filed Dec. 22, 1976, Ser. No. 753,609
Int. Cl.² B23P *19/04*
U.S. Cl. 29—262 **10 Claims**



1. A pulling tool for pulling an object relative to a support and comprising:

a pole having engaging means at one end thereof for engaging an object to be pulled;

a stop affixed at a selected position on said pole;

a threaded rotatable sleeve loosely receiving said pole therein and having one end for abutment with said stop and another end from which said engaging means projects;

an annular member threadedly engaging the exterior of said sleeve for movement of said sleeve axially of said annular member upon rotation of said sleeve;

standoff means coupled to said annular member for engaging a support while said object is pulled; and

means for turning said sleeve to retract said sleeve and said pole.

4,045,857

METHOD FOR MANUFACTURE OF ALUMINUM SHEET AND SINTERED HIGH-DENSITY ALUMINUM LAMINATE BY DIRECT POWDER ROLLING PROCESS

Yoshikazu Suzuki, Sapporo, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Nov. 6, 1974, Ser. No. 521,369
Claims priority, application Japan, Nov. 8, 1973, 48-125184
Int. Cl.² B22F *3/24*
U.S. Cl. 29—420 **5 Claims**

1. A method for the manufacture of a high density sintered aluminum laminate from aluminum powder which comprises directly rolling of aluminum in powder for the fracturing of the oxide coat on the surface layer of individual aluminum particles and for compacting the aluminum powder into green sheets under rolling pressure sufficient to cause coherence of the aluminum particles and so that the sheets have a fixed strength and uniform density in the direction of the width, piling a plurality of green sheets one on top of another with filaments of inorganic material interposed between adjoining pairs thereof as a reinforcing material, heating and simultaneously rolling the pile of green sheets at a draft in the range of from 25% to 50% at temperatures in the range of from 300° C to 600° C for a period of from 3 minutes to 10 minutes thereby

forming a sintered aluminum laminate and then subjecting the sintered aluminum laminate at least once, before the laminate is allowed to cool below 300° C, to the treatment of rolling at a draft in the range of from 25% to 50% and to the subsequent treatment of annealing thereby allowing the laminate to acquire high density and prescribed thickness.

4,045,858

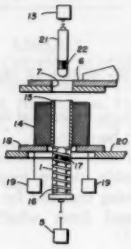
CORE TRANSFER PROCESS

David M. Carr, and Thomas O. Chandler, both of Tuscaloosa, Ala., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 595,971, July 14, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,862

Int. Cl.[2] D01H *9/00*; B23P *19/02*

U.S. Cl. 29—427 **4 Claims**



1. A process for transferring a package of yarn from a hollow core to a dye spring, comprising:

a. in any order:

1. inserting through a first end of said dye spring a reciprocally mounted first transfer head provided with an expandable portion adapted for expansion to grip the remote end of said dye spring,
2. positioning said remote end in axial alignment with said core and in close end-to-end relationship with one end of said core,
3. axially compressing said package, and
4. gripping said core with a second transfer head,

followed by

b. simultaneously withdrawing said core while inserting said remote end of said dye spring through said package.

4,045,859

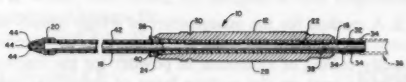
METHOD OF MAKING A SUCTION WAND

Denton A. Cooley; Charles C. Reed, both of Houston, and Russell G. Sharp, Sugar Land, all of Tex., assignors to Texas Medical Products, Inc., Houston, Tex.

Division of Ser. No. 547,529, Feb. 6, 1975, Pat. No. 3,963,028. This application Mar. 12, 1976, Ser. No. 666,289

Int. Cl.[2] B23P *11/02*

U.S. Cl. 29—451 **4 Claims**



1. A method for assemblying a suction wand having a disposable fluids handling conduit and a reusable, weighted handle for the fluids handling conduit comprising:

injection molding at least one fluids handling conduit comprising a forward suction tip, probe, and a rear handle insert including an external enlarged rearwardly tapering surface spaced from the rear end of said insert;

fabricating a handle from metal, the handle having an axial bore generally corresponding to the exterior surface of the insert and a flared end;

telescopically inserting the insert portion of the conduit through the handle; and

friction-securing the handle to the conduit at the insert by urging the flared end of the metal handle against the enlarged tapering surface.

4,045,860

METHOD OF ASSEMBLING AN AEROSOL DISPENSER

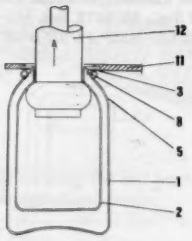
Richard Winckler, Ville D'Avray, France, assignor to Cebal, Paris, France

Filed May 7, 1976, Ser. No. 684,260

Claims priority, application France, May 7, 1975, 75.14928; Feb. 20, 1976, 76.05316

Int. Cl.[2] B23P *11/02*

U.S. Cl. 29—451 **5 Claims**



1. The method of assembling an aerosol dispenser including the steps of:

1. placing a flanged flexible bag within a rigid outer casing,
2. forming a shouldered dome on said casing to define a mouth including an annular collar encircling said mouth,
3. positioning an annular seal above said collar of said mouth,
4. withdrawing the flanged portion of said bag from said casing through said mouth and said seal and positioning said flange and seal in stacked relation on said collar,
5. positioning a cover member above said assembly in overlying relation thereto, and
6. securing said cover to said casing by simultaneously crimping said cover, said flange and said seal to said collar to form an impermeable seal therebetween.

4,045,861

METHOD OF FORMING A PRESSURE ACCUMULATOR

Abduz Zahid, Los Angeles, Calif., assignor to Greer Hydraulics, Inc., Los Angeles, Calif.

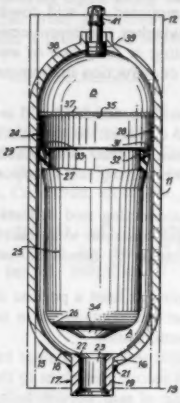
Division of Ser. No. 552,227, Feb. 24, 1975. This application June 18, 1976, Ser. No. 697,421

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—454 **6 Claims**

1. The method of forming a pressure vessel of the type having a deformable separator therein, from an elongated cylindrical rigid metal sleeve having at least one open end, which comprises the steps of inserting an annular supporting member of resilient sheet metal having a cylindrical retaining portion with an annular mounting portion at one end to which the periphery of said deformable separator is bonded into said cylindrical sleeve through said at least one open end so that the cylindrical retaining portion of the supporting member is in juxtaposition to the inner wall surface of the cylindrical sleeve in spaced relation to said open end, thereafter bonding said

retaining portion to said sleeve and thereafter deforming inwardly said at least one open end of said sleeve to close such



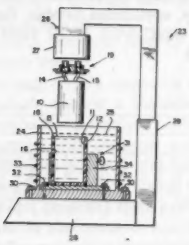
end and thereafter forming an axial opening in said now closed end.

4,045,862

ELECTRONIC COMPONENT AND METHOD

William J. Evans, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Jan. 10, 1973, Ser. No. 322,403
Int. Cl.² H01G 9/10
U.S. Cl. 29—570 **5 Claims**



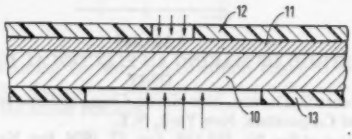
1. A method of closing and sealing an open end of a body housing electrical component means having external terminal means, the method comprising the steps of immersing in a bath a body having an open end connected to a void in the body and electrical component means in the void in the body, filling the void of the body immersed in the bath thru the open end with material of the bath, contacting the immersed body with means for closing and sealing the open end of the body to retain the electrical component means and material of the bath within the body, initiating bonding of a continuous substantially V-shaped means of the means for closing and sealing the open end of the body to a continuous lip circumscribing the open end of the body prior to finally positioning the means for closing and sealing the open end of the body with respect to the body, compressing material of the bath in the void of the body during the bonding together of the body and the means for closing and sealing the open end of the body by means carried by the means for closing and sealing the open end of the body while the body and the means are immersed in the bath, and removing from the bath the bonded together body and means for closing and sealing the open end of the body with the electrical component means and material of the bath.

4,045,863

METHOD OF PRODUCING METALLIC CARRIER SYSTEM FOR A MULTI-ELECTRODE SEMICONDUCTOR STRIP

Gerhard Mitterhummer; Hanns-Heinz Peltz; Heinrich Mayer, all of Munich, and Fritz Conzelmann, Koeigsbrunn, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 385,163, Aug. 2, 1973, abandoned, which is a division of Ser. No. 259,399, June 5, 1972, abandoned. This application Aug. 30, 1976, Ser. No. 718,824
Claims priority, application Germany, June 3, 1971, 2126533
Int. Cl.² B01J 17/00; C23F 1/02
U.S. Cl. 29—588 **6 Claims**



1. A method for producing a metallic carrier system for a multi-electrode semi-conductor chip comprising the steps of:

a. providing a base carrier sheet of a first metal that can readily be soldered;

b. etching recesses in the carrier sheet in portions of the carrier sheet to be covered by inner feed lines;

c. applying covering masks to opposite sides of the sheet by photolithographic process with open portions in the mask on one side of the carrier sheet conforming to the inner feed lines;

d. producing inner feed lines with recessed expansible portions by the galvanic deposition of at least a second metal in the open portions of the mask, and into said recesses, said second metal being of a type capable of being readily connected to a semiconductor body;

e. covering the feed lines with protective layers; and

f. then etching the outer carrier legs from the opposite side of the sheet in accordance with the pattern of the covering mask applied thereto by selective etching;

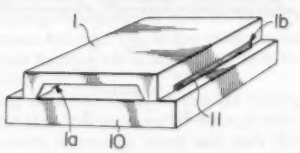
the recessed expansible portions of the feed lines compensating for the difference in expansion between the connection legs of the carrier sheet, the inner feed lines and the semi-conductor chip.

4,045,864

METHOD OF MANUFACTURING MAGNETIC HEADS

Tadashi Morokuma, Tokyo, and Naotsune Tsuda, Hachioji, both of Japan, assignors to Olympus Optical Co. Ltd., Tokyo, Japan

Filed July 8, 1976, Ser. No. 703,501
Claims priority, application Japan, July 29, 1975, 50-92337; Apr. 20, 1976, 51-45108; May 8, 1976, 51-52527
Int. Cl.² G11B 5/42
U.S. Cl. 29—603 **4 Claims**



1. A method for forming magnetic heads, comprising the steps of:

providing a first core block piece having at least one raised portion upon which a gap defining surface is to be etched;

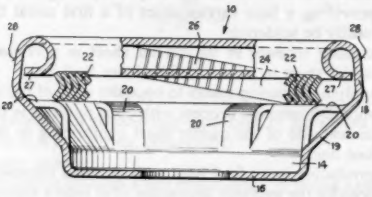
masking at least a pair of spaced areas on each of said raised portions with an etch resistant material;
sputter etching those areas of said raised portions which are not masked so as to form a gap defining surface on each of said raised portions;
disposing a second core block piece in abutting relation with said non-etched areas of said raised portions so as to form a clearance between each said gap defining surface and said second core block piece;
causing a gap filling material to melt and permeate into each said clearance;
solidifying said gap filling material to form a unitary core block; and
cutting said unitary core block so as to form a plurality of magnetic head cores.

4,045,865

METHOD OF MAKING AN ELECTRICAL IGNITING UNIT

Laurence G. Horwitt, New Haven, Conn., assignor to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 715,148, Aug. 17, 1976, Pat. No. 4,007,353.
This application Oct. 22, 1976, Ser. No. 735,071
Int. Cl.² H01C *17/02*
U.S. Cl. 29—611 **3 Claims**



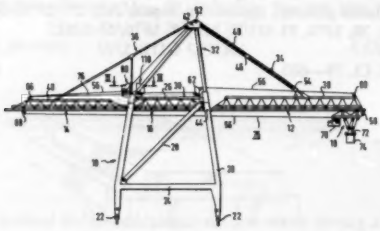
1. The method of making an electrical igniting unit for use with the holders of cigar lighters which includes the steps of forming a shallow metal cup having a relatively thin side wall, subjecting said cup to low temperature nitriding, disposing a spiral-wound heating resistance element in said cup with an outer end of the heating element juxtaposed to the side wall of the cup, and crimping inwardly the entire leading edge of the side wall of the cup so as to sandwich the said outer end of the heating element between the crimp and the side wall.

4,045,866

CRANE AND METHOD OF BUILDING THE SAME

Hans Tax, Potsdamer Str. 3, Munich 40, Germany (8000)

Filed Sept. 13, 1976, Ser. No. 722,427
Claims priority, application Germany, Sept. 26, 1975, 2543041
Int. Cl.² H01R *43/00*
U.S. Cl. 29—628 **6 Claims**



1. In a method of building a crane in which an upright tower is erected at an assembly site, a boom is pivotally fastened to the top portion of the tower, a trolley is installed for movement along the boom, a hoist is suspended from the trolley, a plurality of electrically actuated winches are secured to said tower and connected to said boom, said trolley, and said hoist by tension elements, said boom, trolley and hoist constituting the principal operating elements of said crane, an electric power supply system is mounted on said tower and conductively connected to said winches, the improvement which comprises:

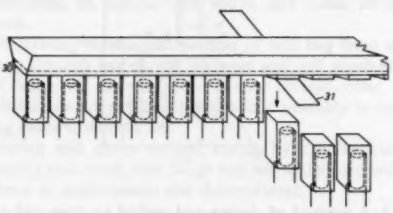
a. fixedly mounting at least two of said winches in a first container at a construction site remote from said assembly site;
b. transporting said container to said assembly site;
c. fastening said container to the erected tower, the fixed mounting of said at least two winches in said container being maintained during said transporting and said fastening;
d. operatively connecting said at least two winches while mounted in said container to at least one of said principal operating elements by means of respective tension elements;
e. fixedly mounting at least a portion of said power supply system in a second container at a mounting site remote from said assembly site;
f. transporting said second container to said assembly site;
g. fastening said second container to the erected tower, the fixed mounting of said portion being maintained during said transporting and said fastening of said second container; and
h. conductively connecting said portion of said power supply system, while mounted in said second container, to said at least two winches fixedly mounted in said first container while said containers are fastened to said tower.

4,045,867

METHOD FOR ENCAPSULATING ELECTRICAL COMPONENTS

Arne Gudmund Ström, Kalmar, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Aug. 13, 1975, Ser. No. 604,438
Claims priority, application Sweden, Sept. 19, 1974, 7411786
Int. Cl.² B29C *6/04, 17/10*; H01G *1/02, 1/153*
U.S. Cl. 29—628 **5 Claims**



1. A method for encapsulating electrical components in capsules filled with a hardenable plastics material, said capsules being part of a mould having a trough-shaped pouring ingate mounted above and in fluid communication with the entrances of said capsules, said capsules being provided with holes in their bottom portions and being spaced from one another along said trough-shaped pouring ingate, each of said electrical components to be provided with a first electrical connection wire connected to a first terminal of said electrical component, and a second electrical connection wire connected to a second terminal of said electrical component, said method comprising: the steps of inserting said electrical components into said capsules such that the connection wires pass through the holes provided in the bottoms of the capsules, one electrical component for each of said capsules; pouring a liquid hardenable plastics material into said trough-shaped pouring ingate, said step of pouring comprising pouring a surplus amount of said liquid hardenable plastics material so that an excess amount of said material remains in said trough-shaped pouring ingate after all of said capsules have been filled, and pouring said

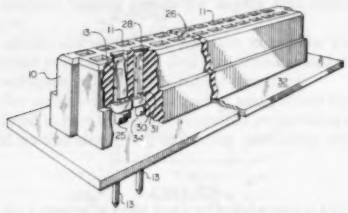
material into said trough-shaped pouring ingate under vacuum; curing said liquid hardenable plastics material; and separating said trough-shaped pouring ingate along with the excess hardened plastics material from said thus-formed encapsulated components such that a plurality of individual encapsulated components results.

4,045,868

METHOD OF FABRICATION AND ASSEMBLY OF ELECTRICAL CONNECTOR

J. Preston Ammon; Harry R. Weaver, both of Dallas, and Claude Rodriguez, Carrollton, all of Tex., assignors to Elfab Corporation, Dallas, Tex.

Division of Ser. No. 597,751, July 21, 1975. This application Mar. 2, 1976, Ser. No. 663,145
Int. Cl.[2] H01R *43/00*
U.S. Cl. 29—629 **16 Claims**



1. A method of assembling an electrical connector which includes a removable insulator having a plurality of sleeves formed therethrough and press fit contacts having upper mating portions for positioning in the sleeves in spaced alignment with a plurality of contact receiving apertures in a mounting substrate, said method comprising:

inserting the contacts into the sleeves in the insulator through the bottom thereof;

seating a generally transversely extending intermediate portion of the contacts against a shoulder formed in the sleeves, the contacts being retained within the sleeves by frictional engagement with the inner walls thereof;

guiding the portions of the contacts protruding from beneath the insulator into the aligned receiving apertures;

mounting the insulator generally flush against the mounting substrate to press fit the contacts into the apertures for rigidly securing the contacts to the substrate while permitting the insulator to be removed from the contacts by applying an upward force to overcome the frictional engagement between the contacts and the inner walls of the sleeves.

4,045,869

METHOD FOR PRODUCING ELECTRICAL CONNECTOR STRIPS

Gunter Hartmann, Munich, and Rudolf Winckler, Gauting, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 16, 1975, Ser. No. 613,892
Claims priority, application Germany, Sept. 19, 1974, 2444892
Int. Cl.[2] H01R *43/02*
U.S. Cl. 29—630 A **4 Claims**

1. A method for producing an electrical connector strip comprising the steps of:

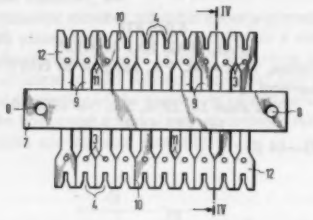
providing a thin planar strip of metal from the group consisting of brass or tin-bronze,

partially cutting the strip to form critical edges thereby,

treating the thereby formed thin planar strip with a strong deoxidation agent,

tinning only those selected portions containing said critical edges of the connector strip to which solder connections are to be made,

affixing an insulation carrier to the strip,



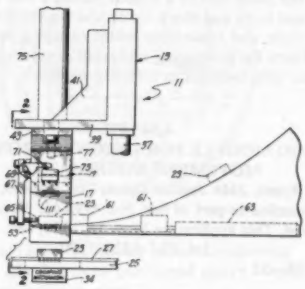
and free-cutting the strip at non-critical edges to form a plurality of connector elements to preserve the solderability of the tinner portions.

4,045,870

SOCKET INSERTER

Eldred D. Scott, Laguna Hills, Calif., assignor to Precision Engineered Products, Inc., Orange, Calif.

Filed Jan. 28, 1977, Ser. No. 763,313
Int. Cl.[2] H05K *3/30*
U.S. Cl. 29—741 **17 Claims**



1. An apparatus for transporting a socket to a location on a base for attachment to the base wherein the socket is of the type having at least one aperture therein, said apparatus comprising:

a supporting structure;

a retaining means on the supporting structure for releasably retaining a socket at a socket retaining station with the aperture in the socket being at a predetermined location;

a socket holding mechanism including at least one protrusion sized for entering said aperture and being releasably retained therein;

means for mounting the socket holding mechanism for movement from a first position located on the side of the socket retaining station remote from the base along a path which extends through the socket retaining station and toward same location on said base and back toward the first position;

said mounting means mounting the socket holding mechanism so that said protrusion moves through said predetermined location in moving along said path toward said location on said base and said retaining means releasably holding the socket at the retaining station sufficiently so that the protrusion is inserted into said aperture and releasably retained therein as the socket holding mechanism is moved through the retaining station whereby the socket holding mechanism removes the socket from the retaining

means and delivers it to said location at said base for attachment to the base; and

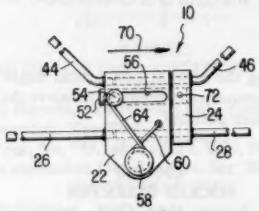
actuator means for moving said socket holding mechanism along said path.

4,045,871

PALATAL EXPANDER

John E. Nelson, Holtwood, Pa., assignor to HMW Industries, Inc., Lancaster, Pa.

Filed June 16, 1976, Ser. No. 696,510
Int. Cl.[2] A61C 7/00
U.S. Cl. 32—14 E 16 Claims



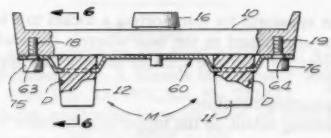
1. An orthodontic device for intraoral use comprising a body, means carried by said body for connecting said body to an anchor tooth on one side of a human palate, a block joined to said body or relative movement between the two, means carried by said block for connecting said block to an anchor tooth on the other side of a human palate, a bias spring acting between said body and block for producing relative movement between them, and removable means engaging both said body and said block for preventing said relative movement until said device has been installed in a human mouth.

4,045,872

ANALOG MODULE FOR RECONVERSION OF JAW MOVEMENT INFORMATION

Gene W. Arant, 2444 Jupiter Drive, Los Angeles, Calif. 90046

Continuation-in-part of Ser. No. 419,641, Nov. 28, 1973, abandoned. This application Mar. 14, 1975, Ser. No. 558,284
Int. Cl.[2] A22C 7/00
U.S. Cl. 32—32 18 Claims



1. An analog module for dental articulators, comprising:

an elongated metallic support member adapted to fit underneath and in parallel relationship to either a reconverter instrument upper frame or an articulator upper frame,

said support member having on each of its ends means for removable attachment thereof to a corresponding frame,

said support member having adjacent each of its ends an integrally formed separate retaining means; and

a pair of analog blocks made of a hard material capable of being milled, each of said blocks being disposed beneath said member and being attached to a respective one of said retaining means to be rigidly supported thereby, so that said member maintains a fixed lateral spacing of said blocks;

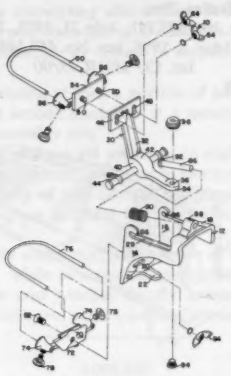
whereby when the module is attached to a reconverter instrument upper frame a pair of openings representing the jaw movement pattern of a patient may be formed in the lower sides of said blocks, and when the module is subsequently attached to an articulator upper frame the relative positions of said block openings remain unchanged.

4,045,873

DENTAL ARTICULATOR

Walter L. Burnett, 4336 Covington Highway, Decatur, Ga. 30035

Filed June 28, 1976, Ser. No. 700,141
Int. Cl.[2] A61C 11/00
U.S. Cl. 32—32 19 Claims



1. In a dental articulator for mounting a dental model comprising upper teeth and lower teeth:

a base frame having means thereon for supporting the base stably on a flat surface such as a table or desk,

a pivoting frame on said base comprising an upper arm extending on said pivoting frame and having a transverse attaching plate formed integrally therewith, said plate having a pair of vertical adjusting slots therein,

an upper plate having spaced mounting sleeves attached thereto,

a removable upper model frame having respective terminal ends insertible into a respective sleeve,

a pressure means for holding said removable upper model frame in place,

attaching means on said plate to provide the vertical adjustment for the articulation of the upper and lower model thru the vertical movement of only the top,

a lower bracket comprising a lower model frame and a lower plate,

a pair of spaced mounting sleeves on said lower plate,

said lower model frame having respective terminal ends insertible in the respective openings in the mounting sleeves and adjustable pressure means for holding said lower model frame in place.

4,045,874

DENTAL DRILL GUIDE ATTACHMENT

Richard C. Roman, 230 Westmoreland Drive, Vernon Hills, Ill. 60060

Filed May 17, 1976, Ser. No. 686,716
Int. Cl.[2] A61C 13/12
U.S. Cl. 32—40 R 10 Claims

1. A drill guide attachment for dental drills and the like, which attachment comprises:

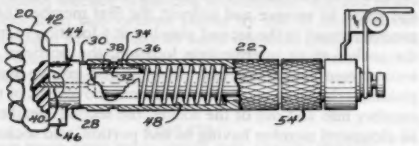
a first sleeve defining a bore adapted to receive a dental drill therein;

means for securing said first sleeve to a drill positioned in said first sleeve;

a second sleeve in telescoping, coaxial, sliding relation with

said first sleeve and positioned adjacent an end of said first sleeve, said sleeves being adapted for bidirectional axial motion relative to each other, said second sleeve having an outer end defining a flat surface in a plane transverse to the axis of said second sleeve, whereby the positioning of said flat surface against a workpiece simultaneously positions said drill positioned in said sleeves in a predetermined manner relative to said workpiece;

means for limiting the distance of said bidirectional, axial motion between said sleeves;



and resilient biasing means for urging said sleeves axially apart;

said second sleeve defining aperture means for viewing the contact point between a drill positioned in said sleeves and a workpiece during the drilling operation;

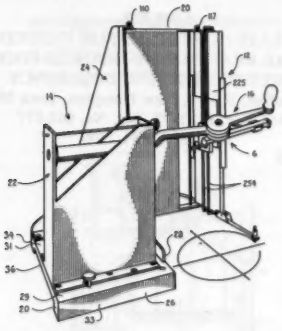
said flat surface at the outer end of said second sleeve being defined in part by a pair of opposed projections carried by said second sleeve and extending outwardly therefrom.

4,045,875

ELLIPSOGRAPH DRAFTING APPARATUS

Raul Chajon Cortez, 2046 S. Elizabeth, Apt. 1602, Wichita, Kans. 67213

Filed Mar. 18, 1976, Ser. No. 668,268
Int. Cl.² B43L *11/04*
U.S. Cl. 33—30 D **15 Claims**



1. An ellipsograph drafting apparatus to draw any ellipse existing within major and minor axes boundaries of a straight line to a circle on a horizontal marking surface, comprising:

a. a main support means;

b. an intermediate connector means having a linkage assembly pivotally connected to said main support means and a base support member pivotally connected to said linkage assembly for pivotal movement about a vertical axis;

c. an elliptical control means connected to said main support means and said intermediate connector means;

d. said elliptical control means having a protractor control assembly rotatable about a horizontal axis, a slide and crank arm assembly rotatably mounted to said protractor control assembly, to a pivot arm and slide assembly connected to said slide and crank arm assembly, and a marking instrument and actuator assembly connected to said base support member;

e. said pivotal arm and slide assembly mounted on said base support member for conjoint movement therewith about the vertical axis and for vertical movement relative thereto;

f. slide and crank arm assembly having a connector member pivotally connected to a pivot member of said pivot arm and slide assembly; and

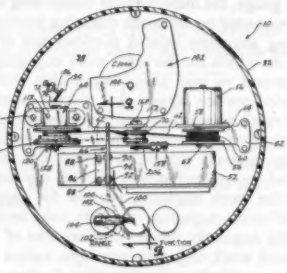
g. said connector member rotatable about a common central point in planes from 0° to 90° relative to a vertical axis through said central point to cause said pivot member to move identical to said connector member and transmit a vertical projection of the movement of said pivot member onto the horizontal marking surface through said marking instrument and actuator assembly.

4,045,876

LIQUID LEVEL INDICATOR AND FLOW MEASURING DEVICE

James H. Bowen, Des Moines, Iowa, assignor to W. G. Jaques Company, Des Moines, Iowa

Filed July 7, 1975, Ser. No. 593,889
Int. Cl.² G01B *5/18*
U.S. Cl. 33—126.6 **13 Claims**



1. In a liquid level indicating means comprising,

a housing adapted to be positioned above a body of water having an upper surface,

a movable probe line having a probe on the lower end thereof extending downwardly from said housing, said probe line and said probe being electrically conductive,

control means in said housing for intermittently lowering and raising said probe line so that said probe is intermittently moved into and out of engagement with the upper surface of said liquid, said control means including a reversible power means secured to said probe line, a timing means, and a control circuit interconnecting said power means and said timing means, first means in said control circuit connected to said probe line, said probe and said power means and being electrically responsive to engagement of said probe to the upper surface of said liquid to cause said power means to reverse itself to raise said probe line upon contact of said probe with the upper surface of said liquid, second means in said control circuit to stop the upward movement of said probe line, said timing means being operatively connected to said power means to effect the lowering of said probe line by said power means after a predetermined length of time,

a recording chart means in said housing,

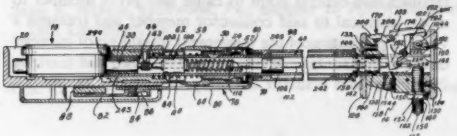
a recording means operatively connected to said probe line which is responsive to the downward movement of said probe line into engagement with said liquid so that the level of said liquid is recorded on said recording chart means.

4,045,877

RETRACTABLE DIAL BORE GAUGE

Harold T. Rutter, Kirkwood, Mo., assignor to Sunnen Products Company, St. Louis, Mo.

Filed Mar. 11, 1976, Ser. No. 665,892
Int. Cl.[2] G01B 5/12
U.S. Cl. 33—178 R 20 Claims



1. In a dial bore gauge for measuring the size and surface characteristics of a cylindrical work surface, said gauge including dial means including a scale and means to indicate a reading on the scale, a work engaging portion including spaced opposed work engaging contacts for engaging opposite sides of a surface to be gauged, one of said work engaging contacts being fixedly positioned on the work engaging portion and the other being movable along an arcuate path primarily in a radial direction thereon, a pair of other work engaging members on the work engaging portion located at spaced locations on opposite sides of one of said work engaging contacts, and means connecting the dial means with the work engaging portion of the gauge, the improvement comprising a first member pivotally mounted on the work engaging portion, said first member having angularly related portions one of which includes means on which the movable work engaging contact is located, and means on said gauge engageable with the other angularly related portion of said first pivotal member biasing said movable work engaging contact outwardly on the work engaging portion whereby said work engaging contacts are able to engage opposite sides of a cylindrical surface being gauged, second means including a second member pivotally mounted on the work engaging portion for supporting the spaced pair of work engaging members, said second pivotal member having angularly related portions one of which supports the spaced work engaging members, means engageable with the other angularly related portion biasing said second pivotal member and said pair of spaced work engaging members mounted thereon outwardly into engagement with the surface being gauged, and means operable to retract the movable work engaging contact and the spaced pair of work engaging members on the work engaging portion, said retraction means including an operator member having separate operative connections to the first and second pivotal members.

10. In a dial bore gauge for measuring the size and surface characteristics of cylindrical work surfaces, said gauge including dial means for indicating the reading and including a scale and means for indicating a reading on the scale, a work engaging portion including spaced opposed work engaging contacts for engaging opposite sides of a cylindrical surface to be gauged, one of said work engaging contacts being fixedly positioned on the work engaging portion and the other being movable along an arcuate path primarily in a radial direction thereon, a pair of other work engaging members on the work engaging portion at spaced locations on opposite sides of one of said work engaging contacts, and means operatively connecting the dial means with the work engaging portion of the gauge, the improvement comprising means for mounting the movable work engaging contact on the work engaging portion including a shaft fixedly supported on the work engaging portion and a member pivotally mounted on said shaft, said pivot member having an opening therethrough for receiving said shaft, said opening having a diameter larger than the diameter of the shaft and a pair of spaced shoulders formed on one side of said opening, biasing means located on said pivotal member and engageable with said shaft to bias the shaft into engagement with said spaced shoulders, said pivotal member having a first arm portion extending therefrom to a free end, a hardened work engaging member mounted on said arm and adjacent to said free end to form said movable work engaging contact, and a second arm portion, and means operatively connecting said second arm portion with the means for indicating the reading on the scale, said last means including means normally biasing the pivotal member in a direction to move the movable work engaging contact along an arcuate path about the said shaft primarily in a radial outward direction

19. Means to mount a first member in a second member comprising a spherical first member having predetermined hardness and wear characteristics, a second member having a portion with a socket formed therein, said socket being of a size and shape to receive and support the first member therein, a groove formed in the second member at a location to intersect the socket at an intermediate location, the portions of said second member on opposite sides of the groove resiliently yielding relative to each other to permit movement of the first member into and out of the socket, the second member being an elongated member having an end portion, said socket being formed in the end portion, said groove extending into said elongated member from the socketed end portion a distance substantially greater than the diameter of the socket.

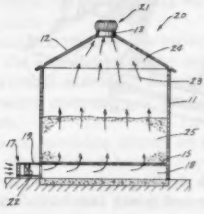
20. Means to mount a first member in a second member comprising a spherical first member having predetermined hardness and wear characteristics, a second member having a portion with a socket formed therein, said socket being positioned adjacent one side thereof, and of a size and shape to receive and support the first member therein, a groove formed in the second member at a location to intersect the socket at an intermediate location, the portions of said second member on opposite sides of the groove resiliently yielding relative to each other to permit movement of the first member into and out of the socket, the groove formed in the second member bifurcating a portion thereof, the portions of the second member difurcated by the groove being of different thickness in opposite sides of the groove.

4,045,878

VENTILATION PROCESS FOR INDUCING BIOCHEMICAL REACTIONS IN STORED FOOD GRAIN WHILE PRESERVING DORMANCY

Sylvester L. Steffen, R.R. 3, New Hampton, Iowa 50659

Filed Dec. 19, 1975, Ser. No. 642,577
Int. Cl.[2] E04H 7/00
U.S. Cl. 34—26 3 Claims



1. A method for controlling the storage environment of cured grain wherein hydrolysis of the grain starches and protein is stimulated under conditions which restrict respiration of grain within a grain storage structure of a type including:

means for forming a grain storage chamber including a top and a bottom portion;

a perforated floor forming at least a part of the bottom portion of said grain storage chamber;

means attached to said perforated floor for forming a plenum chamber below said perforated floor;

an atmospheric air inlet opening disposed in said plenum chamber means;

damper means attached to said plenum chamber means for selectively opening or closing said inlet opening;

said top portion having an exhaust opening disposed therein; exhaust means attached to said top portion for forcibly exhausting air from the top of said grain storage chamber; wherein said method comprises:

forcing atmospheric air to flow through the stored grain at substantially all times when the grain moisture at dormancy, for a given grain, locality and time, is above a predetermined grain moisture floor, with said damper means in an open position; and

closing said damper means for substantially preventing the flow of outside air through the stored grain and simultaneously forcibly exhausting accumulated heat and moisture from said exhaust means by use of said exhaust means at substantially all times when the grain moisture at dormancy for a given grain, locality and time, is at or below said predetermined grain moisture floor.

4,045,879

PROCESS FOR TREATING OIL CONTAINING VEGETABLE RAW MATERIALS

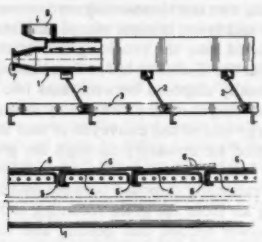
Johan Frederik Witte, Amsterdam-Nieuwendam, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands

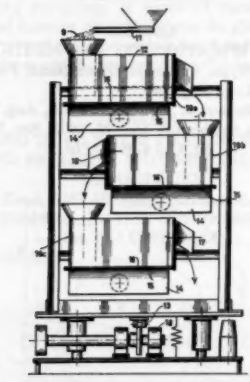
Continuation-in-part of Ser. No. 443,844, Feb. 19, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 658,995

Claims priority, application Netherlands, Feb. 20, 1973, 7302358

Int. Cl.[2] F26B *3/00, 5/00;* **C11B** *1/04, 1/10*

U.S. Cl. 34—31 **7 Claims**





1. A process for treating oil-containing vegetable seed particles to facilitate subsequent oil extraction from said particles, said process comprising the steps of:

a. forming the seed particles in a thin layer in a receiver provided with a bottom having apertures;

b. moving the particles close to one another regularly for a relatively short time and moving the particles away from one another for a relatively short time while advancing said particles through the receiver;

c. the movement of said particles towards and away from one another being obtained by effecting vibration of the receiver with a vertical vibration component having a low frequency of most 1000 vibrations per minute and high amplitude of about 5 to about 50 mm.;

d. supplying a heat and moisture-containing gaseous fluid through the apertures in the bottom of the receiver during periods in which the apertures are open;

e. heating the particles to a temperature of at least 90° C to inactivate enzymes rapidly;

f. thereafter decreasing the moisture content and temperature of the vegetable seed particles, by contacting the particles with each other regularly for a relatively short time and separating said particles from each other also for a relatively short time, said contact and said separation being obtained as in step (c), while a gaseous drying fluid supplied through openings in the bottom acts discontinuously on each individual particle when said oenings are open due to the action of the vertical vibration component.

2. Process according to clalim 1, wherein the oil-containing vegetable seed particles are heated and moistened in a first receiver, in a second receiver their temperature is maintained at a value ranging from 95° to 115° C for 1 to 3 minutes and in a third receiver the raw materials are cooled and dried, the fluids for the heating, moistening and transfer being supplied in each stage.

3. Process according to claim 1, wherein the total amplitude of the vertical component of vibration is between 10 and 40 mm.

4. Process according to claim 1, wherein the frequency of the vibration is between 200 to 400 vibrations per minute.

4,045,880

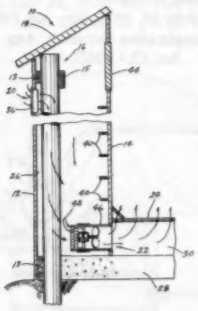
SOLAR GRAIN DRYING APPARATUS

Sylvester L. Steffen, R.R. 3, New Hampton, Iowa 50659

Filed Apr. 12, 1976, Ser. No. 676,125

Int. Cl.[2] F26B *19/00;* **F24J** *3/02*

U.S. Cl. 34—93 **1 Claim**



1. A grain storage structure for utilizing solar energy for heating air and surface winds for circulating heated air through stored grain, said structure comprising:

a base floor;

outside sidewalls constructed of heat absorbing material extending upwardly around the periphery of said base floor, said outside sidewalls forming a first closed structure and including a plurality of air intakes for permitting ambient air to pass through said sidewalls;

controllable louver means positioned over said air intakes for selectively allowing or preventing the flow of ambient air through said sidewalls;

a roof disposed on top of said first closed structure, said roof having openings therein;

inside sidewalls forming a second closed structure and disposed inwardly of said outside sidewalls, thereby forming

a solar plenum between said outside sidewalls and said inside sidewalls;

means for sealing an upper portion of said inside sidewalls with respect to said outside sidewalls;

an air pervious floor disposed above said base floor and within said second closed structure, thereby forming a lower plenum between said base floor and said air pervious floor;

a grain storage chamber formed by said inside sidewalls and said air pervious floor;

means for operably connecting said solar plenum to said lower plenum, whereby air from said solar plenum may enter said lower plenum;

fan means, disposed within said connecting means and disposed between said solar plenum and said lower plenum, for forcing air into said lower plenum and through said grain storage chamber;

controllable damper means positioned within said connecting means for selectively allowing and preventing the flow of air from said solar plenum to said grain storage chamber; and

at least one wind powered turbine disposed over an opening in said roof in communication with said grain storage chamber.

4,045,881

SYSTEM FOR VENTING THE HEATING PIPES OF A TUBULAR ROTARY DRYER

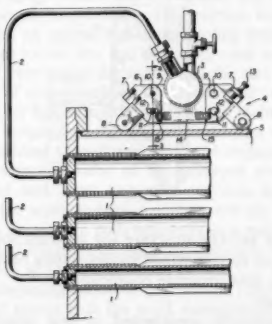
Bernd Brandt, Wesseling-Berzdorf; Peter Jansen, and Heinz Liesenfeld, both of Wesseling, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed July 25, 1975, Ser. No. 599,301

Claims priority, application Germany, Aug. 27, 1974, 2440897

Int. Cl.² F26B *11/04*

U.S. Cl. 34—138 **12 Claims**



1. A venting system for venting air to a collecting pipe from the heating pipes of a tubular rotary dryer, a dryer drum having a longitudinal axis and being rotatable about said longitudinal axis, heating pipes within said dryer drum, said collecting pipe being disposed annularly and continuously around the dryer drum, holding blocks supporting the collecting pipe on the dryer drum, said holding blocks mounted for movement relative to the drum in a direction parallel to said longitudinal axis of the dryer drum, and connector pipe means for connecting said collecting pipe to the heating pipes.

4,045,882

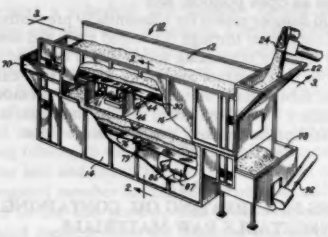
GRAIN DRYING APPARATUS AND PROCESS

James F. Buffington, R.R. No. 4, Plymouth, and Lee E. Norris, R.R. No. 1 Box 341, Mentone, both of Ind. 46539

Filed June 30, 1976, Ser. No. 701,284

Int. Cl.² F26B *17/12*

U.S. Cl. 34—171 **7 Claims**



1. A grain drying apparatus comprising a housing having upper and lower elongated sections, a porous conveyor belt in each of said sections extending substantially the full length thereof, a grain receiving means at one end of the conveyor in said upper section, a grain receiving and holding bin disposed at the other end of the conveyor in said upper section and having and opening for discharging grain onto the conveyor in said lower section, a compartment beneath the conveyor in said upper section, two interconnecting compartments beneath the conveyor in said lower section, one of said latter compartments being located near the receiving end of the conveyor and the other near the discharge end, a first heating means and blower operationally disposed between said two latter compartments for drawing cool air downwardly through the grain near the discharge end of the conveyor in said lower section and forcing heated air upwardly through the grain near the receiving end of said conveyor, and a second heating means and blower operationally disposed between said two conveyors for drawing air from the grain receiving end of the conveyor in said lower section and heating and forcing it upwardly through the conveyor in said upper section.

4,045,883

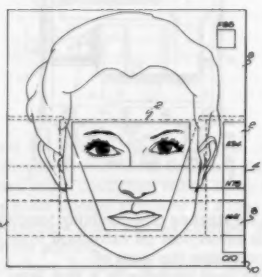
IDENTIFICATION KIT AND METHOD

Wilfred Edward Ryan, 47 Lower Green Road, Pembury, Tunbridge Wells, Kent, England

Continuation-in-part of Ser. No. 852,855, Aug. 25, 1969, abandoned. This application Apr. 20, 1973, Ser. No. 352,894

Int. Cl.² G09B *1/16*

U.S. Cl. 35—28 **2 Claims**



1. A method of assembling a photographic representation of the facial features of a person recollected from the memory of an identifying person, the method comprising the steps of determining from an identifying person at least one basic facial characteristic of the recollected face, selecting from first and

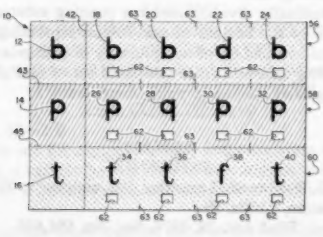
second pluralities of photographic parts a photographic representation of said basic facial characteristic, selecting from said first and second pluralities of photographic parts photographic representations of the remaining facial features of the recollected face, the photographic parts each carrying indicia so that the selection of a photographic representation from one of said pluralities of photographic parts automatically enables the selection of the corresponding photographic representation from the other of said pluralities of photographic parts, and thereafter assembling said selected photographic representations in co-operating and vertically adjustable relationship so as to form first and second corresponding photographic assemblies of said recollected face, a first assembly of photograpic representations comprising a front-face head view and the second assembly of photographic representations comprising a profile view of said front face head view with the facial features in the first assembly being in the same geometric scale as those in the second assembly said first assembly comprising a top facial frame bearing a representation of the top of the head, the forehead, the hair and the ears of the recollected person, a bottom frame bearing a representation of the lower cheeks and chin, separable intermediate parts fitting between said top frame and bottom frame and consisting of a representation of both eyes and upper nose, a representation of the lower nose parts including nostrils and tip and the inner parts of the cheek, and a representation of the mouth, said top facial framing member having downwardly extending projections overlying side portions of said intermediate parts bearing the eyes and the lower nose representations, and the lower two of said intermediate parts occupying the top central portion of said bottom frame, said second profile assembly comprising, a single top and side frame defining the top and one entire side edge which bears a representation profile of the hair, the top of the head, the forehead, and an ear, and which defines part of the other side edge of the assembly, and second, third, fourth and fifth intermediate pieces, representing in sequence an eye on the second piece, a nose on the third piece which is positioned in front of the second piece to define a side extension at one edge thereof in common with the other side edge of the top profile frame, a mouth on the fourth piece and a chin on the fifth piece, said fourth and fifth pieces fitting to each other so as to join along a common edge meeting with the edge of the third piece, the indicia on each of said frames and intermediate pieces in the front face and profile assemblies identifying the facial features and permitting recording, in terms of these indicia, of the separate facial features assembled from the pluralities of photographic parts, to thereby provide a front and a corresponding profile total face which matches a recollected face.

4,045,884

TEACHING DEVICE FOR THE CORRECTION OF READING, SPELLING AND WRITING LEARNING DISABILITIES

Frances Lee Zand, 1247 Hillside, Northbrook, Ill. 60062

Filed Mar. 18, 1976, Ser. No. 668,293
Int. Cl.[2] G09B *17/00*
U.S. Cl. 35—35 R **8 Claims**



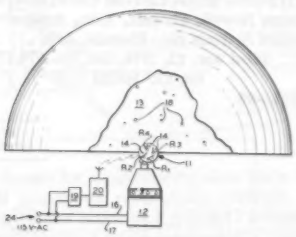
1. A teaching device comprising first means with at least one standard symbol, which is representative of a letter, depicted thereon and at least three test symbols depicted on said first means for each of said standard symbols, each of said test symbols being aligned in a set with an associated standard symbol in a normal reading direction, a majority of said test symbols being identical to, and having the same orientation as, their associated standard symbols, and at least one second means with a matching symbol depicted thereon which is identical to said standard symbol and which is constructed so that said matching symbol may be overlaid selectively on said associated standard symbol or on said test symbols which are aligned with their associated standard symbol to provide a visual test of whether or not said test symbols correspond to their associated standard symbol with which they are aligned, wherein said teaching device is useful for the correction of learning disabilities involving mirror image reversals, recognition and orientation learning disabilities relating to letters, said standard symbols each comprise a standard letter, said test symbols each comprise a test letter and at least one, but not more than a minority, of said test letters are a letter that is mirror image reversal of its associated standard letter, or a letter that is identical to the associated standard letter but is improperly oriented with respect thereto or a properly oriented letter that is similar in some respects, but is not identical, to the associated standard letter and the matching symbols each comprise a matching letter that corresponds to one of said standard letters.

4,045,885

PLANETARIUM WITH STAR IDENTIFYING MEANS

Philip Stern, 3800-21st Ave. North, St. Petersburg, Fla. 33713

Filed July 30, 1976, Ser. No. 710,266
Int. Cl.[2] G09B *27/00*
U.S. Cl. 35—42.5 **9 Claims**

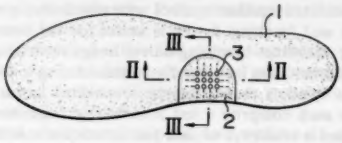


1. In a planetarium (according to claim 1,) having a light emitting star globe with a light source therein and having plural pin holes therein through which light from said source is projected, and a screen upon which such projected light forms separate star images approximately in relationships as stars represented by said images appear visible in the firmament; light occluding means for providing intermittent occlusion of a beam of said light which is projected to form a star image, to cause blinking of said star image, and control means for initiating and terminating said intermittent occlusion; said light occluding means comprising an interrupter unit fixed to a generally spherical wall defining said star globe; said unit including an occluding arm, and an actuator, responsive to said control means, for causing reciprocation of said arm back and forth intermittently into and from the path of light projected from said light source.

4,045,886
MEANS FOR REDUCING FATIGUE FROM WEARING FOOTGEAR

Katsuhisa Terasaki, 43, Okimiyacho, Edogawa, Tokyo, Japan (133)

Filed June 22, 1976, Ser. No. 698,709
Claims priority, application Japan, June 30, 1975, 50-91371[U]; Feb. 19, 1976, 51-18739[U]
Int. Cl.² A43B 13/38
U.S. Cl. 36—44 5 Claims

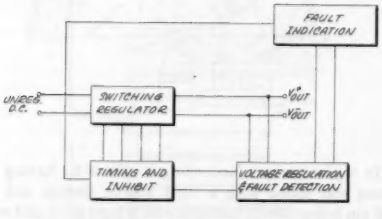


1. A combination of an insole sheet and first and second sheet pieces for reducing fatigue from wearing footgear, said insole sheet being a relatively flexible synthetic resin sheet having a first group of regularly arranged openings which open in at least the upper surface thereof and a second group of regularly arranged openings which open in at least the lower surface thereof, said first and second groups of openings being provided at least in a region which corresponds to the arch portion of the foot, said first sheet piece having a plurality of projections adapted to massage the arch portion of the foot on the upper surface thereof and a plurality of regularly arranged projections on the lower surface thereof which are adapted to engage with said first group of openings, said second sheet having a plurality of regularly arranged projections on the upper surface thereof which are adapted to engage with said second group of openings, wherein said first and second sheet pieces are mounted to said insole sheet at its upper and lower sides, respectively, in a manner to support only the arch portion of the foot.

4,045,887
SWITCHING REGULATOR CONTROL CIRCUIT

John Rawson Nowell, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Apr. 12, 1976, Ser. No. 676,175
Int. Cl.² H02H 7/20
U.S. Cl. 361—98 13 Claims



1. A control circuit for a switching regulator utilizing SCR-inductive reactor switching comprising:

a. timing means connected to the switching regulator for triggering each SCR sequentially at the switching regulators optimal switching rate;

b. first fault detection means connected to the switching regulator for individually detecting over-voltage, under-voltage and over current faults, and providing inhibit signals to the timing means;

c. second fault detection means for providing fault signals to a master control panel for shutting down the switching regulator;

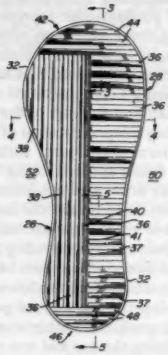
d. fault indication means connected to the fault detection means for individually indicating the type of fault detected; and

e. voltage regulation means connected to the switching regulator output and the timing means for maintaining a desired voltage at the switching regulator output.

4,045,888
ATHLETIC SHOE

Bruce Oxenberg, 6233 Trotter St., Philadelphia, Pa. 19111

Filed Oct. 26, 1976, Ser. No. 735,873
Int. Cl.² A43B 5/00, 13/04
U.S. Cl. 36—114 21 Claims



1. An athletic shoe, comprising:

a fabric upper;

padding connected to said upper, disposed inside said shoe about the ankle, back and tongue areas of said upper;

a resilient, rubber-like lower, said lower having a sole and a heel portion;

a plurality of gripping members mounted on said lower, each of said gripping members being triangularly shaped in cross-section, each of said gripping members being provided with a principal sloping face depending outwardly from said lower, said triangularly shaped gripping members pointing in the direction of the acute angle which each said principal sloping face makes with said lower;

a first set of said plurality of triangularly shaped gripping members, tranversely disposed along said sole portion of the outside half of the bottom of said lower, pointing towards the rear of said lower;

a second set of said plurality of triangularly shaped gripping members, transversely disposed along said heel portion of the outside half of the bottom of said lower, pointing towards the front of said lower;

a third set of said plurality of triangularly shaped gripping members longitudinally disposed along the inside half of the bottom of said lower, pointing towards the center of said lower; and

a longitudinally dividing member running substantially the length of the bottom of said lower, separating said first and said second set of said plurality of triangularly shaped gripping members from said third set of said plurality of triangularly shaped gripping members.

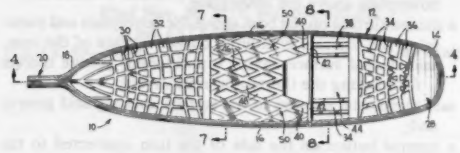
4,045,889
SNOWSHOE

Richard G. Woolworth, Lancaster, Pa., assignor to Woodstream Corporation, Lititz, Pa.

Filed Apr. 29, 1976, Ser. No. 681,445
Int. Cl.² A43B 5/04
U.S. Cl. 36—122 8 Claims

1. A snowshoe comprising rib means including front, side and rear portions defining a continuous peripheral support

surrounding front, central, and rear sections of the snowshoe, said rear and central sections being substantially flat and said front section extending upwardly in a smooth fashion from said central section to define an upturned tip portion, said rear section being defined by latticework means forming openings comprising a major portion of the area of said rear section to permit passage of snow therethrough, said central section including means for securing a foot harness to said snowshoe,



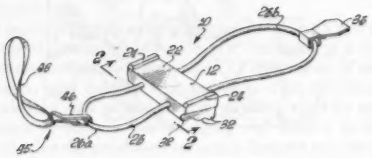
a central portion of said central section adapted to support the shoe of a user and being defined by latticework means forming openings comprising a major portion of the area of said central portion to preclude snow from being trapped between the shoe of the user and the upper surface of the snowshoe, both sides of said central portion of said central section being substantially continuous to preclude passage of snow or the like therethrough and provide additional flotation to the snowshoe.

4,045,890

SKI BOOT CLEAT

John A. D'Alessandro, 9236 Appleby St., and Lawrence A. Tuohino, 9331 Gallatin Road, both of Downey, Calif. 90240

Filed Aug. 18, 1976, Ser. No. 713,633
Int. Cl.² A43B *5/00*; A43D *5/00*
U.S. Cl. 36—132 **5 Claims**



1. A removable ski-boot cleat comprising:
a cleat body member with fulcrum means formed thereon;
a stretchable strap removably secured to said cleat-body member;
a pair of longitudinally disposed channels formed in said cleat-body member, wherein each channel includes corresponding slots through which said strap is passed to be held in said channels;
mounting means for stretching said strap to attach said cleat to said boot; and
restraining means to removably attach the ski to said boot.

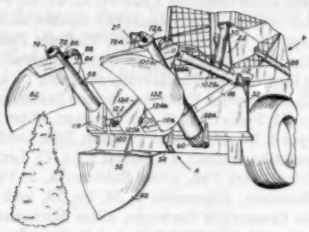
4,045,891

DEVICE FOR DIGGING, BALLING AND RELOCATING A TREE AND OTHER MATERIAL

Leonard A. Grew, 43 Kingston Road, Duluth, Minn. 55801

Filed Jan. 19, 1976, Ser. No. 650,565
Int. Cl.² A01G *23/06*
U.S. Cl. 37—2 R **16 Claims**

14. Device for digging, balling and relocating material for use with a vehicle having an attachment plate and means for lifting and lowering the attachment plate comprising, in combination:
a. a first side blade segment and a second side blade segment, with the first and second side blade segments at least partially forming a receptacle having an open top when in a juxtaposed relation,
b. first and second arms having longitudinal axes,
c. means for rotatably mounting each of said arms about the longitudinal axis thereof on the attachment plate,
d. means for pivotally mounting each of said arms at one end thereof on the attachment plate about an axis substantially perpendicular to the longitudinal axis of the arm, and



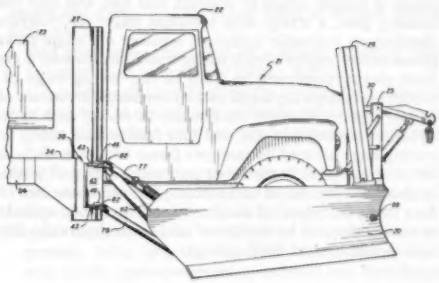
e. first and second means for rotating and pivoting said first and second arms, respectively, with the first blade segment being carried by the first arm and the second blade segment being carried by the second arm, to thereby move the first and second side blade segments together and to separate the first and second side blade segments.

4,045,892

HYDRAULICALLY OPERATED FRONT AND REAR WING HANGERS FOR SNOW PLOWS

Eugene A. Farrell, Fishers Landing, N.Y., assignor to Frink Sno-Plows, Clayton, N.Y.

Filed Nov. 8, 1976, Ser. No. 739,499
Int. Cl.² E01H *5/00*
U.S. Cl. 37—50 **7 Claims**



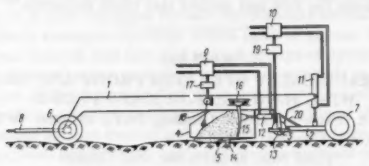
1. Hanger means for a patrol wing plow blade on a snow plow vehicle comprising substantially vertically extending front and rear tubular ways, each way tube being secured to the vehicle and having a single longitudinally extending slot therein, slide means for each way partially within and partially without the way and having portions extending through the way slot, a double action hydraulic cylinder in each way, the cylinder being secured to the portion of the slide within the way, a piston within the cylinder having a piston rod extending downward in the way and having its lower end secured to the lower end of the way, the rod having a first passage therein extending from the bottom end up through the piston and in communication with the interior of the cylinder above the piston and a second passage extending from a point adjacent the bottom of the way to a point adjacent the piston and in communication with the interior of the cylinder below the piston, each passage having means at the bottom of the way for connecting the passage with a source of fluid under pressure, the respective portion of each slide outside the way being operatively connected to opposite ends of the plow blade, whereby the plow ends are raised and lowered by the selective admission of fluid under pressure to the passages.

4,045,893

AUTOMATED PLANER

Mikhail Leibovich Feinzilber, Budapeshtskaya ulitsa, 17, korpus 5, kv. 62; Eduard Nikolaevich Kuzin, ulitsa 3 Internatsionala, 74, kv. 199; Gennady Ivanovich Timofeev, ulitsa 3 Internatsionala, 69, kv. 97, all of Leningrad; Semen Semenovich Roitershtein, ulitsa Generala Khazova, 32, kv. 20, Pushkin Leningradskoi oblasti; Jury Stepanovich Kozlov, ulitsa Dimitrova, 10, korpus 1, kv. 160, Leningrad; Vladimir Fedorovich Korelin, ulitsa Belgradskaya, 20, kv. 123, Leningrad; Nikolai Vasilievich Dmitrievsky, Piskarevsky prospekt, 10, kv. 289, Leningrad; Igor Petrovich Bratyshev, proezd Solomennoi Storozhki, 12a, kv. 52; Fedor Evstafievich Omelyan, ulitsa Zhivopisnaya, 5, korpus 4, kv. 49, both of Moscow; Efim Iosifovich Sheinis, Budapeshtskaya ulitsa, 17, korpus 5, kv. 75, Leningrad; Vladimir Grigorievich Pak, ulitsa Rakhimova, 3; Vladimir Ivanovich Romanov, mikroraion 2, 36, kv. 29, both of Andizhan; Zalman Eremeevich Garbuzov, ulitsa Michurinskaya, 13, kv. 20, Leningrad, all of U.S.S.R., and Grigory Borisovich Naret, deceased, late of Leningrad, U.S.S.R. (by Avgustina Alexandrovna Naret, administrator)

Filed Apr. 22, 1976, Ser. No. 679,131
Int. Cl.[2] E02F *5/00*
U.S. Cl. 37—108 A **11 Claims**



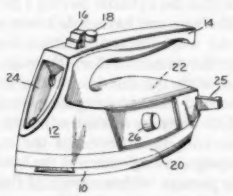
1. An automated planer comprising: a fore frame; a rear frame; a hinged means to connect said fore and rear frames; running gear; a scoop with a cutting edge; electrohydraulic distributors; hydraulic cylinders; a planer dip angle pickup, a prime-mover engine clutch engagement mechanism; a ground level pickup positioned in front of the cutting edge of said scoop; said planer dip angle pickup connected by means of one of said electrohydraulic distributors to one of said hydraulic cylinders joining said rear and fore frames; said scoop with a cutting edge secured on said fore frame with side walls joined by a bottom plate in their rear part and a rear wall positioned in slideways parallel to said bottom plate and connected to said fore frame by means of another of said hydraulic cylinders in its turn connected by another of said electrohydraulic distributors to said ground level pickup.

4,045,894

IRON WITH THERMOSTAT MOUNT

Kaj Toft, Monroe, Conn., and Llewellyn D. Busby, Asheboro, N.C., assignors to General Electric Company, Bridgeport, Conn.

Filed Nov. 22, 1976, Ser. No. 743,680
Int. Cl.[2] D06F *75/06, 75/26*
U.S. Cl. 38—77.83 **4 Claims**



1. An extra capacity steam iron having a soleplate with heating means, separate forward main, and rear surge, steam generators, means selectively delivering water to the generators, and heat regulating thermostat means, the improvement comprising:

a walled enclosure on said soleplate between the generators;

a boss upstanding from the soleplate disposed in and smaller than said enclosure to provide some peripheral space therebetween;

a coverplate to define steam distributing means from the generators,

the boss extending through the enclosure and above the coverplate above the coverplate;

a slanted surface on the boss above the coverplate and parallel to the adjacent contoured outside surface of the iron; said slanted surface having a positioning groove therein for locating the thermostat repetitively;

said thermostat secured to the surface abutting said groove and;

a control button on the side of the iron connected to the thermostat;

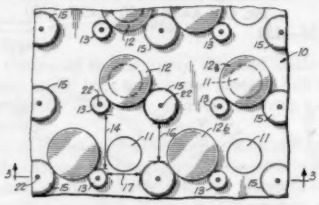
whereby a direct coupling connects the side control button and thermostat which responds to both main and surge steam demands for a substantially uniform soleplate temperature.

4,045,895

DISPLAY SIGN

Gerald L. Work, Spokane, Wash., assignor to American Sign and Indicator Corporation, Spokane, Wash.

Filed July 26, 1976, Ser. No. 708,913
Int. Cl.[2] G09F *11/34*
U.S. Cl. 40—28 C **3 Claims**



1. In an information display device having:

an upright panel with a plurality of discrete light-transmitting areas arranged along transversely spaced upright columns and surrounded by a background;

a backing member spaced parallel to the panel;

and a plurality of circular discs equal in number to the number of light-transmitting areas on the panel, each disc having a diameter capable of overlying a light-transmitting area and a thickness less than the spacing between the panel and backing member, the diameter of each disc being greater than said spacing;

each disc being located between the panel and backing member for planar movement between a first position overlying a light-transmitting area and a second position clear of such area;

the improvement comprising:

first projection means located in the path of movement of the discs between the panel and backing member and arranged in columns located at a corresponding first side of each light-transmitting area, said first projection means including discrete projections on which the individual discs rest while at their first and second positions, and over which each disc must move when being shifted between its first and second position; and

second projection means spaced transversely apart from said first projection means and located in the path of movement of the discs between the panel and backing member and arranged in parallel columns flanking the first projection means at each side thereof for resting engagement by a disc while at its first or second position respectively;

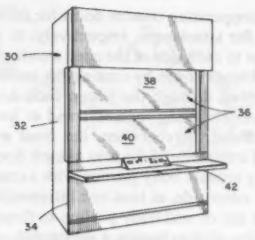
said first and second projection means in adjacent columns being spaced transversely by a distance less than the disc diameter.

4,045,896

X-RAY FILM STORAGE AND VIEWING DEVICE

Bruce E. Adlon, Northbrook; Walter H. Villiers, Chicago, and Sherwin S. Tarnoff, Northbrook, all of Ill., assignors to General Electric Company, Milwaukee, Wis.

Filed Nov. 26, 1975, Ser. No. 635,322
Int. Cl.² G09F *11/32, 13/10*
U.S. Cl. 40—106.1 **10 Claims**



1. In a system for storing and displaying display panel mounted cut film radiographs including: a storage area, a display area, and a main conveyor for carrying said panels between said storage and display areas by lifting said panels at one end thereof, the improvement comprising:

means for positioning and damping pendulum motion of said panels when carried on said conveyor to and from said display area,

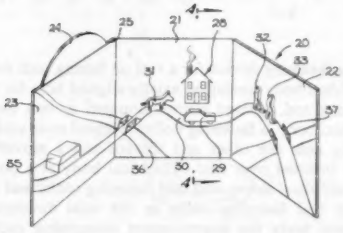
said positioning and damping means including a pair of cams rotated synchronously with said conveyor in a direction corresponding to the direction of movement of said conveyor, said cams positioned to contact the other, free swinging, end of said display panels carried by said conveyor to restrain said swinging end relative to said one end whereby pendulum motion is damped and the panel is correctly positioned for entry to or egress from the display area.

4,045,897

COHESIVE DISPLAY BOARD

Victor Genez Gates, 1342 Harvard, Santa Monica, Calif. 90404

Filed Apr. 29, 1976, Ser. No. 681,584
Int. Cl.² G09F *1/00*
U.S. Cl. 40—125 A **6 Claims**



1. A display board comprising:

a. a surface being at least partially coated with a powdered synthetic fiberous material;

b. at least one display item having at least one side coated with a powdered synthetic fiberous material for selectively engaging portions of said partially coated surface;

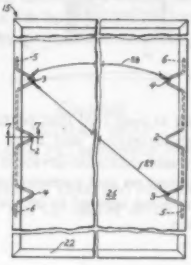
whereby, said display item may be displayed by disposing said display item on the coated portion of said surface such that said fiberous material on said display item engages at least a part of said coated portion of said surface.

4,045,898

MAT-RETAINING SPRING FOR PICTURE FRAME

James Donald Reinhardt, Pewee Valley, Ky., assignor to Cardinal Extrusions Co., Louisville, Ky.

Filed Sept. 3, 1976, Ser. No. 720,271
Int. Cl.² G09F *1/12*
U.S. Cl. 40—156 **10 Claims**



1. A mat retainer for the inwardly open frame space of a unitary rectangular frame having a perimetric wall and spaced relatively wide and narrow front and rear face-flange means on said perimetric wall, comprising:

A. a resilient strip having a length smaller than the smallest of the side and end length dimensions of the frame, a still smaller width and shallower depth and also having a concavo-convex curvature substantially throughout its length and depth, said curvature being in a plane normal to its width,

1. said strip being composed of a strand of spring wire provided with at least two loops which are

a. spaced longitudinally along the length of the strip and

b. arranged to extend in the same lateral direction across the width of the strip between its concave and convex faces,

2. the bulge of said concavo-convex strip having an amplitude sufficient substantially to bridge the frame space between the front and rear face-flange means,

3. said concavo-convex strip, when its bulge is compressed, being laterally insertable side-wise or edge-wise into an operative position between said face-flange means,

a. said compressed bulge tending to expand in said operative position toward said front and rear face-flange means, which prevent complete expansion,

4. said concavo-convex strip being operative, when operatively inserted between said face-flange means with a mat in place adjacent the front face-flange means, to exert sufficient expansive force to press the margin of the mat forwardly and hold it against the said front face-flange means.

4,045,899

INDICATOR DEVICE FOR A GARMENT HANGER

William H. Richardson, Oklahoma City, Okla., assignor to City Products Corporation, Chicago, Ill.

Filed Feb. 17, 1976, Ser. No. 658,595
Int. Cl.² G09F *3/00, 3/04*
U.S. Cl. 40—322 **11 Claims**

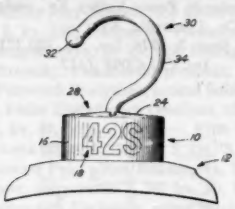
1. An indicator device for use in conjunction with a garment hanger having a hook comprising, in combination:

a flexible disc section having an edge, a central aperture therethrough and at least a pair of slots extending substantially radially from said central aperture, said slots termi-

nating prior to said edge, said flexibility, central aperture and slots cooperatively defining means for flexing said disc section to receive said hook in an assembled state;

a sidewall section extending from said edge of said disc section; and

an indicia secured to said sidewall section;



said slots defining at least two disc portions, said disc portions securingly engaging said hook in said assembled state, whereby said indicator device is substantially positionally maintained on said garment hanger;

said disc portions being tapered to increase the flexibility of said disc section.

4,045,900

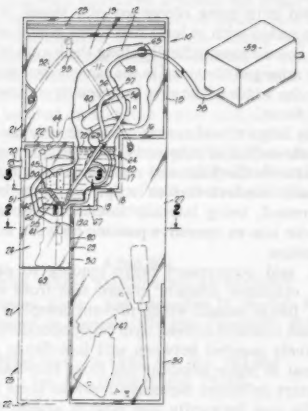
GUN CLEANER

John A. Byer, 820 S. Maryland St., Apt. 107, Los Angeles, Calif. 91205

Filed June 29, 1976, Ser. No. 700,766

Int. Cl.[2] F41C *31/00*

U.S. Cl. 42—1 R 8 Claims



1. A gun cleaning system, the combination including:

a. a gun container having pouch adapted to receive a gun with its barrel pointed downward, and having an elongated barrel-receiving portion of reduced cross-sectional size, extending downwardly from said pouch;

b. said barrel-receiving portion being adjustable in length to accommodate the barrel of said gun;

c. a cleaning solution in said pouch filling said barrel-receiving portion; and

d. means whereby said barrel-receiving portion may be elongated below said barrel to permit said cleaning solution to drain downwardly into a position below said gun barrel.

4,045,901

TRAWLER DOORS

Augusto Prudenzi, 84 Partridge Ave., Somerville, Mass. 02145

Filed Sept. 29, 1976, Ser. No. 727,952

Int. Cl.[2] A01K *73/04*

U.S. Cl. 43—9 6 Claims

1. A pair of cooperating trawler doors for fishing, said doors being adapted for attachment, respectively, to a pair of towlines affixed one to each side of the open mouth of a trawler net and to hold the mouth open by causing the towlines to diverge as the net is towed through the water, each door comprising upper and lower stiffening members and at least three sheet metal plates affixed therebetween, the front and rear plates extending over a majority of the area of each door and defining a longitudinally arcuate body portion with a convex inner side and a concave outer side, at least one intermediate plate being offset from the arc of said body portion to form a louver providing a plurality of slots having a substantial vertical component for passage of water through the door from one side to the other as the door is towed through the water, first attaching means affixed to the forward portion of the convex inner side of the door for attaching the forward portion of one of said towlines to the towing vessel, and second attaching means affixed to the aft portion of the concave side of the door for attaching the aft portion of said towline to the net.

4,045,902

FASTENING DEVICE FOR A REEL ON FISHING RODS

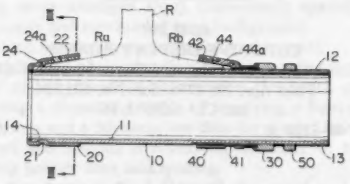
Ryuichi Ohmura, Shizuoka, Japan, assignor to Fuji Kogyo Co., Ltd., Japan

Filed Apr. 5, 1976, Ser. No. 673,542

Claims priority, application Japan, July 17, 1975, 50-99946[U]

Int. Cl.[2] A01K *87/06*

U.S. Cl. 43—22 2 Claims



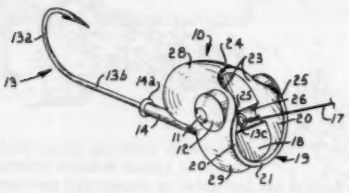
1. In a fastening device for a reel on fishing rods comprising a cylindrical body having an axially aligned hole for receiving the fishing rod, a fixed sleeve mounted to one end of said cylindrical body, a fastening collar screwed over said cylindrical body near the other end thereof and a movable sleeve slidably inserted over said cylindrical body at a position between said fixed sleeve and said fastening collar and co-movable with said fastening collar in the axial direction of said cylindrical body the improvement comprising each of said sleeves being provided with a shell-shaped hood on the side of which said reel is to be mounted, said hood comprising an arched top wall portion and a pair of plain side wall portions tangentially merging into the circular wall portin of said sleeve, a recess formed through said top wall portion of said hood, and a seat piece made of a resilient resin material and having an outer projection snugly received within said hood said outer projection being snugly received within said recess,

said seat piece having an inner cavity to snugly receive one foot of said reel, and said cavity having an arcuate top terminating in spaced vertical side walls that are parallel to each other in any plane normal thru said cavity.

4,045,903
ARTIFICIAL FISHING LURE

Douglas W. Parker, 2720 S. Waldron Road, Fort Smith, Ark. 72901

Filed Feb. 2, 1976, Ser. No. 654,071
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.11 **9 Claims**



8. An underwater fishing lure comprising:
a lure body having a leading end when traveling through water;
a substantially flat surface on the leading end of said lure body, said surface being inclined from vertical at a rearwardly inclined angle from bottom to top of the surface when the lure travels through water;
a rim section extending substantially around the periphery of said surface and projecting forwardly thereof, said rim section including a pair of spaced side walls projecting forwardly on opposite sides of said surface;
trough means presenting a generally transverse recess in said surface for directing water against said side walls;
a harness having first and second legs terminating in respective end portions spaced apart from one another;
a spinner member mounted to swivel on the end portion of said first leg; and
flexible means for attaching said lure body to the end portion of said second leg in a manner permitting said lure body to roll about the axis of said second leg and to pivot thereon.

4,045,904
FISH HOOK EXTRACTOR

Joseph C. Lore, Ridge, Md. 20680

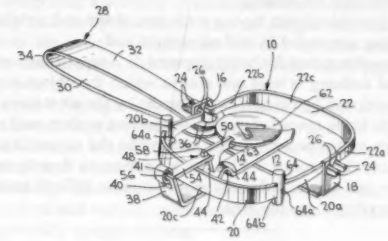
Filed Apr. 28, 1976, Ser. No. 681,288
Int. Cl.² A01K *97/00*
U.S. Cl. 43—53.5 **1 Claim**

1. A fish hook extractor comprising an elongated rigid bar member of circular cross section, a handle extension on one end of the bar member for rotating the bar member on its longitudinal axis during use, and a substantially circularly curved rigid loop integrally formed on the other end of the bar member and extending away from one side of the bar member and lying in a plane with the bar member, the handle extension projecting laterally of the bar member substantially normal to said plane, said loop terminating in a straight side extension arranged at an angle of about 45° to the longitudinal axis of the bar member, said straight side extension having a square end face forming on the extension a substantially square corner closely spaced from one side of the bar member so that a fishing line or leader for a predetermined size of fish hook may pass through the small gap between said square corner and bar member, and said gap blocking passage of the predetermined size of fish hook therethrough so that the hook when introduced into the loop cannot leave the loop by way of the small gap, said straight side extension converging with said bar member and forming therewith a wedge passage by means of which the bight of a fish hook within the loop can be engaged and firmly twisted by manual rotation of the bar member on its longitudinal axis.

4,045,905
ANIMAL TRAP

Anthony J. Souza, Lititz, Pa., assignor to Woodstream Corporation, Lititz, Pa.

Filed Nov. 6, 1975, Ser. No. 629,679
Int. Cl.² A01M *23/26*
U.S. Cl. 43—88 **13 Claims**



1. In an animal trap including a base, a pair of generally U-shaped jaws, each comprising a pair of parallel spaced legs and a cross member, said cross member having an inner gripping face, said legs being journaled in said base for pivotal movement of said jaws toward and away from each other between fully open, when set, and fully closed, when sprung, positions; spring means operatively associated with said jaws and normally operative to pivot said jaws toward each other to the fully cosed position in which said cross members abut each other at the inner gripping faces; and animal actuated trigger means for releasing said spring means: the improvement comprising spacer means comprising at least one elongated spacer element mounted on at least one leg of at least one of said jaws and extending toward the corresponding leg of the other of said jaws whereby the corresponding leg of the other of said jaws abuts said spacer means when said trap is sprung to space said jaws apart a predetermined distance and prevent same from fully closing, said cross members being free of spacer means and said inner gripping faces being unimpeded by said spacer means.

11. For use in combination with a trap of the animal actuated, leg-hold type which includes spring means normally operative upon a pair of generally U-shaped jaws for pivoting said jaws toward each other to a fully closed position, a jamb element for maintaining said jaws at least slightly spaced apart when said trap is in the fully closed position, said jamb element comprising a body having slot means for closely receiving one of said jaws therein whereby said jamb element is mounted on said jaw, said body including a portion extending from said jaw to and abutting said other jaw when said trap is in the fully closed position, said body being a generally elongated cylinder, said slot means comprising a slot formed in one end of said body, said slot being longitudinally extending and comprising

opposite generally parallel side walls and an end wall, said side walls inclining toward each other at their free ends, and said portion comprising the other end of said body.--

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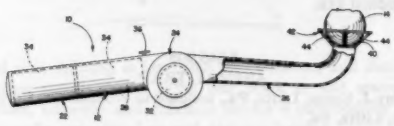
4,045,906

PLAY DEVICE FOR SUSPENDING AND MOVING A FLOATABLE OBJECT RELATIVE TO MOVABLE AREAS

Adolph E. Goldfarb, 4614 Monarca Drive, Tarzana, Calif. 91356, and Erwin Benkoe, 17965 Medley Drive, Encino, Calif. 91316

Filed Feb. 12, 1976, Ser. No. 657,484
Int. Cl.² A63H *29/16, 33/26*
U.S. Cl. 46—44 **18 Claims**



1. A play device comprising

a. a hand holdable blower means for providing a selectively directable air stream;

b. a floatable object having such size, shape and weight for being suspended in said air stream; and

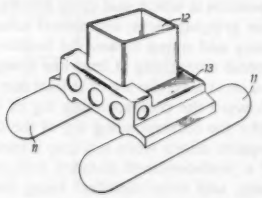
c. movable means for being disposed on a supporting surface and defining at least one area in which the object is to be positioned by being moved thereto by the air stream, said area being spaced above the supporting surface, said movable means being movable relative to the supporting surface when contacted by the air stream to thereby move the said area and thereby render it more difficult to move the object into the area.

4,045,907

FLOATABLE TOYS

Michael Anthony Mumford, Peterborough, England, assignor to Miles Mumford Limited, England

Filed Jan. 19, 1976, Ser. No. 650,359
Claims priority, application United Kingdom, Jan. 17, 1975, 2185/75; Sept. 11, 1975, 37408/75
Int. Cl.² A63H *23/04*
U.S. Cl. 46—93 **8 Claims**



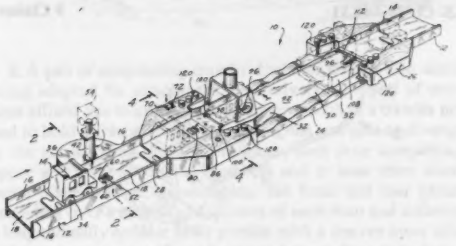
1. A floatable toy and adapted to float on water, comprising two hulls, a container for water and means mounting said container on and between said hulls, a discharge outlet connected to said container at or near the bottom thereof, said mounting means being constructed and arranged to maintain said container at all times clear of the surface of water on which said toy floats even when said container is filled with water, said discharge outlet comprising a nozzle which extends downwardly from the bottom of said container and includes an opening directed rearwardly of said toy being constructed and arranged such that when water in said container is allowed to discharge through said outlet, the discharge imparts a forward reaction which drives said toy through the water.

4,045,908

POWERED VEHICLE TRANSPORT VEHICLE AND TRACK HAVING A WELL THEREIN

Burt Ensmann, Flush; Edwin A. Nielsen, Oceanside; Edward Snyder, III, Dix Hills, and Frank D. Ventura, Commack, all of N.Y., assignors to Ideal Toy Corporation, Hollis, N.Y.

Continuation of Ser. No. 494,699, Aug. 5, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,343
Int. Cl.² A63H *17/26*
U.S. Cl. 46—204 **21 Claims**



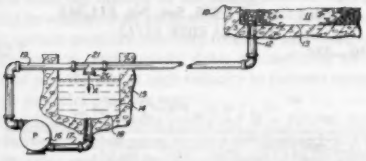
1. A toy comprising, in combination, a powered toy vehicle having a power source contained therein and at least one driven wheel, driven by said power source for driving against a supporting surface to propel the powered vehicle thereover, and a transport vehicle including a frame, said frame having a support surface comprising means for supporting said powered vehicle thereon; and releasable stop means mounted in said frame for selectively preventing movement of said powered vehicle beyond a predetermined position on said support surface, said frame including at least one pair of drivingly engaged wheels rotatably mounted therein and located in direct peripheral engagement with each other; one of said engaged wheels located in said frame to engage the driven wheel of said powered vehicle when the latter is in said predetermined position, to be driven by said driven wheel, and the other of said engaged wheels being at least partially exposed in said frame to engage the surface on which the transport vehicle is placed, whereby the driven wheel of the powered vehicle directly drives said one engaged wheel to cause said other of the engaged wheels to propel the frame in the driving direction of the powered vehicle.

10. A toy for use with a powered toy vehicle having a pair of driven rear wheels for driving against a supporting surface to propel the powered toy vehicle thereover, said toy including a track providing a vehicle support surface defining a path of travel for such vehicles, said track including a track section having an elongated well formed therein extending along a portion of said path of travel, a transport vehicle positioned in said well and having two pairs of track engaging wheels rotatably mounted thereon and a vehicle support platform located at substantially the same elevation as the vehicle support surface of said track, said transport vehicle including a pair of transmission wheels rotatably mounted thereon and respectively frictionally engaged with the wheels of one of said pair of track engaging wheels and which extend through said support platform in predetermined positions to respectively engage the driven wheels of the powered toy vehicle, and releasable stop means mounted in said transport vehicle for selectively preventing movement of said powered toy vehicle from the track support surface onto the transport vehicle beyond a predetermined position on the support platform of the transport vehicle at which the driven wheels of the powered toy vehicle engage the transmission wheels of the transport vehicle, thereby causing the transmission wheels and said one pair of track engaging wheels to rotate and move the transport vehicle, and powered toy vehicle thereon, along said elongated well.

4,045,909
HYDROPONIC NUTRIENT FEEDING AND DRAINING SYSTEM

John H. Moss, Phoenix, Ariz., assignor to Hydroculture, Inc., Glendale, Ariz.

Continuation of Ser. No. 260,974, June 8, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 427,443
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 20, 1976
Int. Cl.[2] A01G *31/02*
U.S. Cl. 47—62 1 Claim

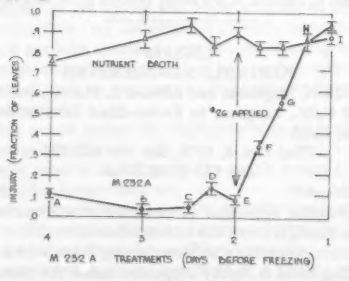


1. A hydroponic growing system including:
a. a nutrient solution supply reservoir;
b. at least one hydroponic growing bed, the bottom of which is located higher than the normal level of nutrient solution in said reservoir;
c. a conduit in fluid communication between the lower portion of said supply reservoir and the lower portion of said growing bed;
d. a nutrient solution supply pump disposed in series in said conduit for withdrawing nutrient solution from said reservoir and introducing said solution into said growing bed in a first mode of operation when said pump is energized; and
e. a dump valve in series in said conduit between said pump and said growing bed for rapidly draining nutrient solution from said growing bed into said nutrient solution reservoir, when said pump is de-energized in a second mode of operation, bypassing said pump, and dump valve comprising:
i. a hollow body member having an inlet and an outlet,
ii. a liquid nozzle member formed in said inlet for receiving nutrient solution under pressure from said pump in said first mode of operation and for discharging said solution into said outlet, and
iii. means defining at least on aperture in said hollow body member intermediate of and in constant unobstructed communication with said inlet and said outlet for draining nutrient solution into said reservoir during said second mode of operation, bypassing said pump.

4,045,910
METHOD FOR REDUCING FROST DAMAGE OF PLANTS

Deane C. Arny, and Steven E. Lindow, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Aug. 2, 1976, Ser. No. 710,414
Int. Cl.[2] A01G *1/00*
U.S. Cl. 47—2 4 Claims

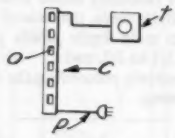


1. The protection of plants against frost damage comprising treating the plants with a bacterium identified as M232A (*Erwinia herbicola* var. anamus) at a time prior to onset of freezing temperature sufficient to permit adequate propagation for establishment and distribution of the bacterium over the plants.

4,045,911
VERSATILE HORTICULTURAL GROWTH APPARATUS

R. Louis Ware, 2108 Middlefork Road, Northfield, Ill. 60062

Continuation of Ser. No. 618,828, Oct. 1, 1975, abandoned. This application Nov. 11, 1976, Ser. No. 740,872
Int. Cl.[2] A47G *7/00*; A01G *9/02*
U.S. Cl. 47—39 20 Claims



1. Plant growth apparatus for use in artificial light horticulture comprising a plurality of modular elements adapted to be quickly and easily assembled into an integral structure and wherein the relative dispositions of said modular elements within said structure can be readily altered, which apparatus comprises:
a. a pair of upright substantially vertical support columns;
b. internal support means disposed between said vertical columns to laterally space and rigidize said vertical columns into a base frame;
c. laterally extending leg portions affixed at the bottom of each of said vertical columns to support said base frame in generally upright fashion;
d. receptive connecting means at corresponding spaced intervals on the laterally outward face portions of said vertical columns;
e. at least a pair of laterally extending shelf support brackets having fastening means at their inner ends adapted to be fastened into said receptive connecting means on said vertical columns, each pair of brackets being respectively disposed one on each of said columns at the same vertical position on the same face side of the columns;
f. an elongate, multiple outlet electric power strip energized by a single external power feed line connection positioned vertically on one of said support columns and extending vertically on said column for at least a portion of the column height, with at least one of the electric outlets in said strip being closely adjacent the fastening point of each of said shelf support brackets disposed on said column;
g. at least one generally rectangular light-providing shelf unit substantially horizontally disposed upon each pair of said laterally extending support brackets, said light-providing shelf unit comprising:
i. a flat upper surface adapted to hold plant materials and other objects as a shelf area,
ii. an open under section containing laterally disposed therein at least one fluorescent tube light, the area beneath said open under section defining a plant growth area which is substantially as wide as the distance between said column supports, and
iii. end encasement sections extending longitudinally outwardly from said open under section, said encasement sections containing the ballast units and other electrical circuitry for the fluorescent light operation, and wherein said shelf support brackets engage said light-providing shelf unit outside said plant growth area at said end encasement sections.

4,045,912

PRODUCTION OF ALFALFA SEEDS

Paul L. F. Sun, Beloit, Wis., assignor to Kent Feeds, Inc., Muscatine, Iowa

Filed Nov. 6, 1974, Ser. No. 521,255
Int. Cl.[2] A01H 1/02
U.S. Cl. 47—58 17 Claims

1. A process for producing alfalfa seeds which comprises:

Step A - crossing by controlled pollination cytoplasmic male sterile alfalfa plants with maintainer line alfalfa plants to give cytoplasmic male sterile hybrid alfalfa seeds,

Step B - selectively recovering the hybrid seeds produced in Step A,

Step C - crossing, using random pollination, cytoplasmic male sterile hybrid alfalfa plants derived from seed produced in Step A randomly mixed with male fertile alfalfa plants to give alfalfa seeds, the ratio of male sterile hybrid alfalfa plants to male fertile alfalfa plants being in the range of about 1:1 to 3:1, and

Step D - non-selectively recovering the seeds from the last-mentioned crossing.

4,045,913

FIRE RESISTANT, SOUND ATTENUATING, DROP SEAL DOOR

John T. Wright, Cattaraugus, N.Y., assignor to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 512,344, Oct. 4, 1974. This application Mar. 31, 1976, Ser. No. 672,160
Int. Cl.[2] E06B 7/215
U.S. Cl. 49—307 6 Claims

1. A solid, fire resistant sound attenuating, drop seal door which comprises in combination:

a. a solid, sound attenuating door, having an elongated slot, wholly embedded in the bottom rail thereof;

b. an elongated generally U-shaped cover to fit snugly within said slot;

c. an elongated gasket support movably positioned within said cover;

d. an extension secured to the gasket support and extending beyond the inner stile of the door;

e. a plurality of parallelogram shaped wedges disposed in two series positioned within said cover, a first series of wedges having wedge elements spaced apart and rigidly affixed to said cover, a second series of wedges having wedge elements alternately spaced between the elements of the first series and rigidly affixed to said gasket support, all of said wedge elements formed with confronting plane cam faces in a manner that when the extension is moved in a horizontal direction by contact with the inner door jamb, the second series of wedge elements and gasket support will move downwardly with respect to said first series of wedge elements and the rectangular cover; and

f. a horizontally disposed tension means coupled between the first and second series of wedge elements for raising the gasket support when the door is opened;

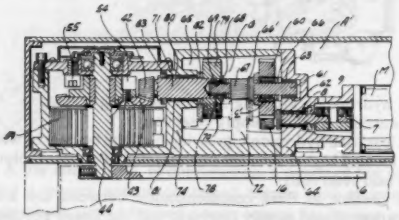
said confronting cam faces being so disposed that the cam faces at one end of said wedge elements serve to cam the gasket support downwardly against the bias of the horizontally disposed tension means, and the cam faces on the opposite ends of said wedge elements serve to cam the gasket support upwardly under the influence of the horizontally disposed tension means.

4,045,914

AUTOMATIC DOOR OPERATOR

John C. Catlett, Milwaukee, Wis., assignor to The Stanley Works, New Britain, Conn.

Filed Sept. 8, 1975, Ser. No. 611,342
Int. Cl.[2] E05F 15/12
U.S. Cl. 49—334 7 Claims



1. A door operator for utilization with swing-mounted doors comprising a prime mover, a door driving shaft, means connecting said door driving shaft to the door to be operated thereby, means mounting said door driving shaft for rotation about its vertical axis, a drive shaft operatably engaged to said prime mover and having its longitudinal axis perpendicular to the axis of said door driving shaft, and transmission means connecting said prime mover drive shaft and said door driving shaft for operation of the latter into door opening condition pursuant to the power of the prime mover, said transmission means comprising an input shaft axially aligned with said drive shaft and operatably engaged thereto, a first driving gear carried on said input shaft, a first driven gear meshing with said first driving gear, a first shaft axially parallel to said input shaft, an over-riding clutch coupling said first driven gear and said first shaft, a second driving gear engaged upon said first shaft between the over-riding clutch and the end of said first shaft remote therefrom, a bevel pinion shaft axially aligned with said first shaft, means engaging said first shaft and said bevel pinion shaft in coaxial relationship, a second shaft axially parallel with said first shaft, a second driven gear carried on said second shaft between its ends and meshing with said second driving gear, a third driving gear carried on one end of said second shaft spacedly from said second driven gear, a third driven gear mounted on said bevel pinion shaft and meshing with said third driving gear, and cooperating bevel gear means operatively interconnecting said door driving shaft and said bevel pinion shaft at the end of the latter remote from said first shaft.

4,045,915

PORTABLE SANDBLASTER

Neal J. Gilbert, Highland, and Edward L. Horton, San Gabriel, both of Calif., assignors to Enviro-Blast International, Los Angeles, Calif.

Filed Oct. 6, 1975, Ser. No. 620,052
Int. Cl.[2] B24C 3/06
U.S. Cl. 51—427 16 Claims

1. In portable apparatus to sandblast a worksurface of a particular configuration, the combination of:

a structure comprising an outer casing from which a sandblasting hood is rigidly supported inside the casing,

the casing having an outer end opening and the sandblasting hood having an outer end extending through the outer end

opening of the casing to provide a projecting open end for application to the worksurface;

a rotatable sandblasting nozzle in the hood directed towards the end opening thereof;

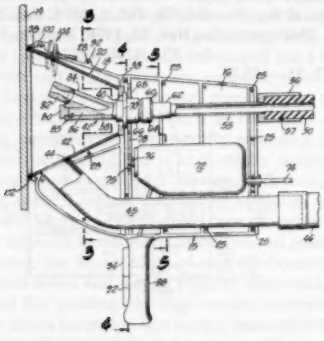
means to deliver to the nozzle a stream of grit-laden compressed air;

a seal carried by the projecting open end of the sandblasting hood, said seal extending beyond said projecting open end and being adapted to make intimate contact with said worksurface and cooperate therewith to isolate the interior of the sandblasting hood chamber from the atmosphere and from the interior of the casing;

means to withdraw an air stream from the sandblasting hood to entrain particles resulting from the sandblasting operation and to continuously draw atmospheric air into the hood past the seal at high velocity to prevent escape of the grit particles past the seal;

said withdrawing means operating at a rate to maintain a relatively high vacuum in the sandblasting hood and thus compress said seal against the worksurface with a fluid pressure differential force which, if unopposed, would tend to immobilize the structure relative to the worksurface; and

thrust means carried by said outer casing and extending therefrom for moving contact with the worksurface to divert a sufficient portion of said force from the seal to make the structure readily manually movable along the worksurface.



16. In an apparatus for sandblasting worksurfaces of different configurations, the combination of:

a casing having an outer end opening;

a set of sandblasting hoods with open ends for use interchangeably in the casing, each hood being releasably attachable to the casing inside the casing with the open end of the hood conforming to the outer end opening of the casing,

each of said hoods having a continuous seal around the rim of its open end with the seal extending beyond the end opening of the casing and being adapted to contact the worksurface and cooperate therewith to confine in the hood particles resulting from the sandblasting operation,

the sandblasting hoods of said set having their open ends and seals shaped to conform to different configurations of worksurfaces;

blasting nozzle means for employment in each of the processing chambers;

a supply conduit to deliver to the nozzle means a stream of grit-laden compressed air;

means to cooperate with each of the interchangeable hoods to withdraw therefrom an airstream entraining the particles resulting from the sandblast operation,

said withdrawing means operating at a rate to maintain a vacuum in the sandblasting hood and thus compress said seal against the worksurface with a force which, if unopposed, would tend to immobilize the seal relative to the worksurface; and

thrust means mounted on and extending from said casing and equipped with means for moving contact with a worksurface to divert a sufficient portion of said force from the seal to the worksurface to make the structure readily manually movable along the worksurface.

4,045,916

ROLLING DRIVE ON A GEAR GRINDING MACHINE

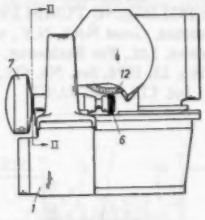
Max Seitz, Munich, Germany, assignor to Carl Wurth Maschinen- und Zahnradfabrik, Munich, Germany

Filed Nov. 14, 1975, Ser. No. 632,069

Claims priority, application Germany, Nov. 26, 1974, 2455808

Int. Cl.[2] B24B *17/00*

U.S. Cl. 51—123 G **3 Claims**



1. A gear grinding machine for grinding teeth or workpieces, comprising:

a rotatable workpiece spindle;

a rotary grinding wheel;

rolling motion producing means including a movable rolling cam carriage and a rolling cam pivotally supported thereon and arranged to reciprocate said workpiece spindle in a predetermined path; and

adjusting means for adjusting the pivot axis of said rolling cam relative to the axis of said workpiece spindle.

4,045,917

GEAR GRINDING MACHINE

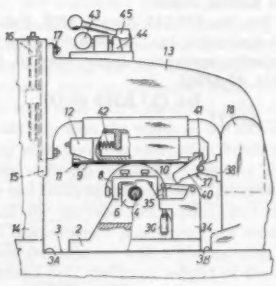
Herbert Loos, Dorfen; Max Seitz, Munich, and Manfred Erhardt, Puchheim, all of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik, Munich, Germany

Filed Nov. 14, 1975, Ser. No. 632,080

Claims priority, application Germany, Dec. 13, 1974, 2459033

Int. Cl.[2] B24B *19/00, 17/00*

U.S. Cl. 51—123 G **8 Claims**



1. A gear grinding machine for grinding teeth on workpieces, comprising:

a rotatable workpiece holder;

a rotary grinding wheel having an annular active surface;

deformable roller motion producing means arranged to reciprocate said workpiece holder in a predetermined path and to simultaneously rock the gear teeth formed on the workpiece about the axis thereof so as to impart to a given tooth flank of the workpiece back-and-forth rolling movements with respect to and along the active surface of said grinding wheel; and

control means for additionally and synchronously controlling the rotatable reciprocating motion of said workpiece during its range of movement so that the tension on said deformable rolling motion producing means is maintained constant and the workpiece is not subjected to the action of disengaging forces which result from deformation of said rolling motion producing means so that stray movements of said workpiece relative to said active surface are avoided.

4,045,918

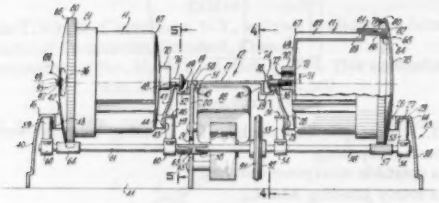
ABRADING AND POLISHING TUMBLER APPARATUS

Robert Nathan Freedman, Great Neck, N.Y., assignor to Natural Science Industries, Ltd., Far Rockaway, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,868

Int. Cl.² B24B *31/02*

U.S. Cl. 51—164 **16 Claims**



1. A tumbling apparatus comprising a tumbling barrel, bearing means for supporting a first end section of said barrel for free rotation of said barrel about a longitudinally extending axis and for free rocking of said barrel about a transversely extending axis and engaging said barrel first end section at selectively transferable alternative points respectively concentric and eccentric to the central longitudinal axis of said barrel, said axes of rotation and rocking extending substantially through said bearing means, and drive means for simultaneously rotating and rocking said tumbling barrel about said longitudinally extending and transverse axes, respectively, when said bearing means engages said first end section at said eccentric point.

4,045,919

HIGH SPEED GRINDING SPINDLE

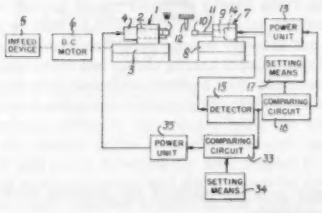
Sadao Moritomo, Ichikawa, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan

Division of Ser. No. 576,183, May 9, 1975, Pat. No. 4,019,288. This application Jan. 13, 1976, Ser. No. 648,829

Claims priority, application Japan, May 10, 1974, 49-52082; May 16, 1974, 49-54916

Int. Cl.² B24B *49/00*

U.S. Cl. 51—165.77 **11 Claims**



1. An apparatus for grinding a workpiece comprising: a grinding wheel spindle assembly having a rotary wheel spindle, and a grinding wheel attached at one end of said wheel spindle; a wheel spindle motor connected to rotationally drive said wheel spindle at a first revolution speed effective for feed grinding and at a value different from that corresponding to a first resonance frequency of said wheel spindle as determined when said grinding wheel is in pressure contact with the workpiece to thereby feed-grind the workpiece and to rotationally drive said wheel spindle at a second revolution speed lower than said first revolution speed and at another value different from that corresponding to a second resonance frequency of said wheel spindle as determined when said grinding wheel is in spark-out operation; a speed controller coacting with said wheel spindle motor to effect rotation of said wheel spindle at said first revolution speed and responsive to a detecting signal to effect rotation of said wheel spindle at said second revolution speed; workpiece supporting means for supporting a workpiece and being movable relative to said grinding wheel spindle assembly; and feed sensing means for detecting spark-out or finish of the feed grinding and providing a corresponding detecting signal which is transmitted to said speed controller to accordingly lower the revolution speed of said wheel spindle to said second revolution speed.

4,045,920

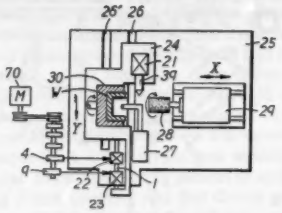
CAM-CONTROLLED GRINDING MACHINE

Nobuo Fukuma, Toyota, and Hideyuki Matsubara, Toyoake, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Division of Ser. No. 656,076, Feb. 6, 1976, Pat. No. 4,015,372. This application Nov. 23, 1976, Ser. No. 744,400

Int. Cl.² B24B *49/04*

U.S. Cl. 51—165.88 **3 Claims**



1. In a cam-controlled grinding apparatus including a rotatable abrasive wheel mounted on the bed thereof and slidable in the axial direction of said wheel, a chuck, capable of holding a workpiece, disposed in confrontation with the abrasive wheel and rotatable about an axis substantially parallel to the wheel axis and furthermore movable in a direction normal to the wheel axis, a wheel feed mechanism for controlling the relative movement between said workpiece and said wheel by means of a cam, a dresser, including a dresser point, for dressing said wheel, and a dresser feed mechanism, the improvement of said grinding apparatus comprising:

measuring means for measuring a dimension of the workpiece processed while grinding is taking place;

final dimension signal means for issuing a final dimension signal as soon as the dimension measured by said measuring means has reached a predetermined target dimension;

release means for separating the wheel from the workpiece in response to said final dimension signal;

watching means for determining when sparkout grinding has proceeded for a predetermined period of time and for issuing a sparkout signal when said predetermined period of time has elapsed;

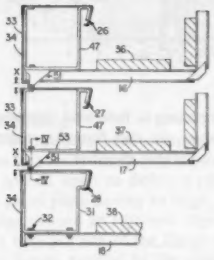
comparison signal means for issuing a comparison signal in response to the comparison of the timing between said final dimension signal and said sparkout signal whenever said final dimension signal precedes said sparkout signal; and

compensating means for compensating wear of said dresser point upon issuance of said comparison signal.

4,045,921
ALIGNMENT DEVICE FOR TELESCOPING GYMNASIUM SEATING

Richard P. Molloy, Portage, Mich., assignor to Interkal, Inc., Kalamazoo, Mich.

Filed July 22, 1976, Ser. No. 707,611
Int. Cl.² E04H *3/12*
U.S. Cl. 52—9 **4 Claims**



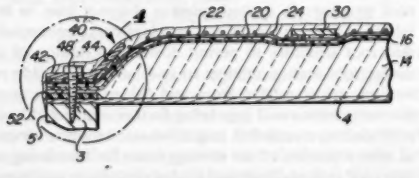
1. In a telescoping gymnasium seating unit, including a plurality of movable upright frame means respectively sized and movable between a first position wherein said frame means are nested one in the other when fully telescoped and a second position wherein said frame means are unnested, each of said frame means having horizontal support members and seating means thereon adjacent the front ends thereof with an upwardly facing, elongated and horizontally extending planar-like seating surface thereon and a horizontally facing skirtboard extending downwardly from the outwardly facing edge of said seating surface, each of said seating means on each of said frame means being vertically offset from a seating means on a mutually adjacent frame means in said second position of said frame means, the lower edges of said skirtboards being vertically spaced above said seating surfaces when said frame means is in said first position, the improvement comprising:

low friction means secured to said seating means and extending downwardly therefrom and engaging the upwardly facing seating surface of the next seating means located therebelow when said frame means are in said first position to maintain said vertical spacing uniform between said seating means when vertical loads are applied to said seating means when said frame means are in said first position.

4,045,922
INSULATIVE ROOF APPARATUS FOR MOBILE HOMES AND THE LIKE

Frank S. Elliott, 4815 N. 63rd Drive, Phoenix, Ariz. 85033

Filed June 28, 1976, Ser. No. 700,324
Int. Cl.² E04B *7/00*
U.S. Cl. 52—94 **4 Claims**



1. Insulative roof apparatus for mobile home buildings and the like, including structural members comprising, in combination:

a base for the insulative roof apparatus comprising a structural roof of the building and including an outer periphery of the roof secured to outer peripheral structural members of the building;

a flexible edge gasket disposed on the base at the outer periphery of the structural roof to provide a seal for the roof apparatus at the outer periphery of the building;

an insulative layer disposed on the base;

a foil layer disposed on the insulative layer;

a mesh layer disposed over the foil layer;

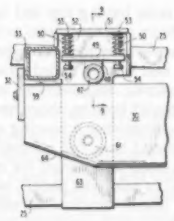
fastening means secured to outer peripheral structural members and to the edge gasket for fastening the insulative layer, the foil layer, and the mesh layer to the structural members of the building; and

seal coat means disposed on the mesh and the fastening means for sealing the insulative roof apparatus to the building.

4,045,923
TELESCOPIC SWINGAWAY JIB

Venkatachalam Shanmugasundaram, Chambersburg, Pa., assignor to Walter Kidde & Company, Inc., Clifton, N.J.

Filed May 6, 1976, Ser. No. 683,747
Int. Cl.² B66C *23/04*
U.S. Cl. 52—118 **8 Claims**



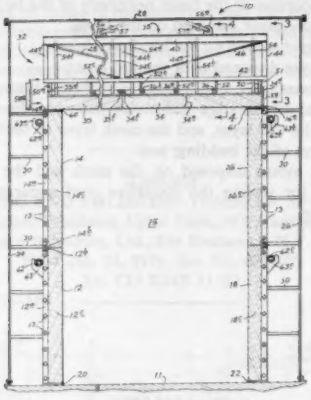
1. An extension jib for crane booms comprising a stationary jib base section adapted for attachment to a crane boom, and an extensible and retractable movable jib section slidably mounted within said stationary jib section, said movable jib having top, bottom and side walls, longitudinally spaced opposing spring-urged rollers mounted on the stationary jib section, said rollers engaging the top and bottom walls of said movable jib section; each spring-urged roller comprising a freely rotatable transverse axis cylindrical roller of sufficient length to substantially span the width of the movable jib section, a mounting plate carrying said roller, headed guide pins engaged slidably with the mounting plate and allowing the mounting plate and roller to move toward and away from the adjacent wall of the movable jib section, and compression springs on said headed guide pins urging the mounting plate and roller toward the adjacent wall of the movable jib section, whereby the rollers bear the dead weight of the moving jib section when the latter is extended from the stationary jib section; and longitudinal spaced opposing bearing pad units mounted on the stationary jib adjacent the spring-urged rollers and engaging the top and bottom walls of the movable jib when the spring-urged rollers yield due to a load being placed on said movable jib section.

4,045,924

FURNACE ROOF CONSTRUCTION

Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

Filed Dec. 15, 1975, Ser. No. 640,965
Int. Cl.[2] E04C 3/04; E04B 7/00
U.S. Cl. 52—125 5 Claims



1. A furnace having upright, laterally spaced refractory wall panels and a truss-panel roof assemblage comprising:

at least one refractory roof panel having supporting frame members attached to an upper face thereof, said roof panel dimensioned lengthwise to span the distance between said wall panels;

a load supporting truss having top and bottom chords, said truss disposed above said roof panel and rigidly connected to said frame members by means of upright legs, said legs interconnecting said bottom chord adjacent opposite ends thereof to said frame members to maintain a selected spacing between said bottom chord and said upper face;

removable means comprising a bearing anchor provided at opposite ends of said truss for releasably connecting said bottom chord to said wall panels for enabling truss loads to be transmitted to said wall panels, said bearing anchors also providing lateral support to said truss-panel roof assemblage; and

a plurality of bracing struts interconnecting said top chord and said frame members for providing additional lateral support to said truss.

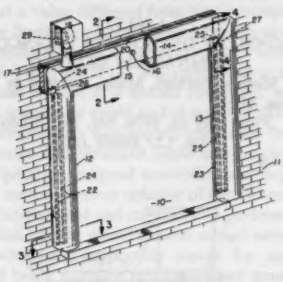
4,045,925

INFLATABLE DOCK SEAL AND MOUNTING THEREFOR

Larry O'Neal, 4953 Timbercrest Drive, Canfield, Ohio 44406

Filed Apr. 30, 1976, Ser. No. 681,796
Int. Cl.[2] E04B 1/345
U.S. Cl. 52—2 5 Claims

1. An inflatable dock seal and mounting therefor for positioning said dock seal on a wall above and beside a dock opening therein and comprising at least one inflatable member arranged in an inverted U-shape and having an upper horizontal section and a pair of spaced vertical sections, flexible noninflatable longitudinally positioned channel-like fastening members on the exterior of at least two of said sections, said fastening members each being integral and U-shaped with the open side facing toward a corresponding vertical section and having attached flanges on each leg thereof, said flanges being attached to said corresponding vertical section to close said fastening member, said fastening members each having an open end, rigid elongated structural members each slidably received therein through said open end to be positioned one in each of said channel-like fastening members, said structural members being attached to said wall through said fastening members



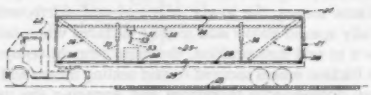
beside said dock opening to hold said sections of said inflatable member thereagainst via said fastening members, and means for inflating said inflatable member.

4,045,926

EASILY ERECTED ROOF STRUCTURE FOR MODULAR BUILDINGS

Louis L. Gibbs, 1547 Silverglade Court, Cincinnati, Ohio 45240

Continuation-in-part of Ser. No. 500,572, Aug. 26, 1974, Pat. No. 3,924,366. This application Dec. 8, 1975, Ser. No. 638,431
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.[2] E04B 1/343, 1/344
U.S. Cl. 52—127 9 Claims



1. A roof structure comprising

a center roof section having two opposed side edges,

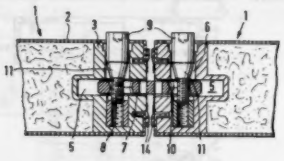
a pair of side roof sections, each of said side roof sections having an outer edge and inner edge, each of said side roof sections being pivotally attached along side inner edge thereof to one of said pivotal edges of said center roof section, said side roof sections being pivotal between a downwardly folded storage position where said side roof sections are disposed substantially perpendicular relative to said center roof section and an erected position where said side roof sections are pivoted upwardly relative to said folded position to form a continuous roof structure with said center roof section, and

a plurality of legs connected to at least one of said center roof section and said side roof sections for supporting said roof structure in spaced relation above a base in both folded and erected positions, said legs being connected to said roof structure to permit downward motion of said center roof section relative to said base as said side roof sections are translated from said folded position to said erected position said legs being further connected to said roof structure such that said downward motion serves as at least a portion of the driving force for translating said side roof sections from said folded position to said erected position.

4,045,927
WALL CONSTRUCTION

D. Angel Chocarro Diaz, Pamplona, Spain, assignor to Iberica del Frio S.A., Spain

Filed Jan. 8, 1976, Ser. No. 647,559
Int. Cl.[2] E04C 2/40; E04B 1/40
U.S. Cl. 52—127 8 Claims



1. A wall, comprising;

a plurality of wall panels, each comprising first and second panel plates generally similar to one another and juxtaposed and spaced apart to define a panel space between them, each panel plate having an edge, a flange extending from the edge toward an adjacent edge of the other panel plate, and a bent portion of the flange extending from an edge of the flange, parallel to the edge of the plate, into the panel space;

a connecting member disposed between the first and second panel plates of each wall panel opposite a similarly disposed connecting member of an adjacent wall panel, each connecting member having a face parallel to the respective flanges, having two mutually parallel grooves in the face, receiving one of the bent portions in each groove, and being thereby secured to the respective wall panel, each connecting member also having a blind opening recessed into the face and a through aperture extending transversely of and through the member in the area of the blind opening;

an anchoring bar for each pair of mutually opposite connecting members, each bar having two end portions, one in each blind opening, each end portion having a bevelled hole; and

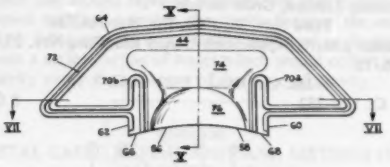
a pair of connecting bolts for each anchoring bar, each bolt having: a screw-threaded end threadedly engageable with the respective connecting member on one side of the respective blind opening, a frusto-conical bolt portion flaring out from the end, and an enlarged body portion extending away from the flaring portion, the enlarged body portion having a diameter substantially equal to the maximum diameter of the bevelled hole, and the flaring portion being normally engageable with the respective bevelled hole, to permit insertion of the bolts, through the anchoring bar, when the panels are slightly spaced apart, and to enable the bolts, when fully threaded into the respective connecting member, to draw the panels together to bear tightly against one another.

4,045,928
END CAP AND CONNECTORS FOR ROOF RIDGE VENTILATOR

Richard C. Malott, Spring Lake, Mich., assignor to Leigh Products, Inc., Coopersville, Mich.

Filed July 18, 1975, Ser. No. 597,036
Int. Cl.[2] B65D 43/06; F24F 7/02; F16L 55/10
U.S. Cl. 52—199 5 Claims

2. An end cap for a generally T-shaped roof ridge ventilator, said end cap having a generally T-shaped body, said body having a deflectable web forming the exterior generally vertical face thereof and flanges defining a peripheral channel means for slidably seating over the end of a generally T-shaped ventilator, said end cap characterized in that the central portion of said web as viewed from the exterior, has a concavity approximately midway between its top and bottom, the portion of said web below said concavity being bowed outwardly

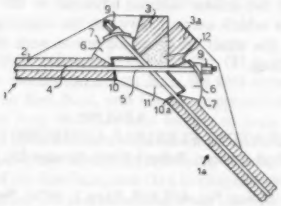


to form a curved portion of progressively decreasing radius toward the bottom thereof to thereby define a flexible bulge.

4,045,929
LIQUIDTIGHT TANK MADE OF PRESTRESSED REINFORCED CONCRETE, PARTICULARLY FOR PURIFICATION PLANTS

Gianfranco Velo Dalbrenta, Via Velo n. 14, Fontaniva, Italy

Filed Dec. 1, 1975, Ser. No. 636,478
Int. Cl.[2] E04H 12/16
U.S. Cl. 52—224 4 Claims



1. A liquidtight tank or reservoir comprising:

a. a plurality of plate elements disposed adjacent to each other according to a pre-established configuration, each of which plate elements is delimited by two rectilinear edges and a pair of plane surfaces and comprises two rectilinear ribs extending along the two rectilinear edges respectively and projecting sideways from one of said plane surfaces; each of said plate elements being provided with holes which are substantially orthogonal to the length of said ribs; each of said rectilinear ribs being provided with a plurality of perforations each of which extends completely through the rib, the dimension of each of said perforations, as measured in a direction orthogonal to the length of said rib, being greater than the dimension of the perforation as measured in a direction along the rib; and each of said ribs being provided at each of said perforations, with a cavity having at its bottom a cylindrical support seating;

b. cables arranged to be put under tension, each of which extends through one of said holes of one plate element and through corresponding perforations of ribs of two plate elements adjacent to said one plate element, the ends of said cable projecting from said perforations into the corresponding cavities;

c. anchorage clamps, each of which locks the ends of one of said cables, and rests on a corresponding one of said seatings and is housed in a corresponding one of said cavities; and

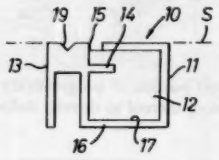
d. filling elements, each of which is disposed between two adjacent ribs belonging to two adjacent plate elements and between the corresponding edges of said elements.

4,045,930

FIRE RESISTANT SEALS

Bernard Dixon, Pampisford, England, assignor to Dixon International Limited, Great Britain

Filed Nov. 24, 1976, Ser. No. 744,736
Claims priority, application United Kingdom, Nov. 27, 1975, 48795/75
Int. Cl.² E16J 15/00; E06B 7/16
U.S. Cl. 52—232 8 Claims



1. A fire-resistant seal for application to a structure, comprising

a holder of substantially tubular form for securing to the structure, the holder having an external elongate opening extending therealong,

a chamber defined by the interior of the holder,

a fire-resistant barrier material which swells under fire-conditions, retained in said chamber in the holder,

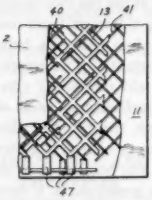
and a baffle surface extending within the holder and forming with the holder interior adjacent to the baffle surface a strait which extends between the opening and the chamber, the strait being co-extensive with the length of the opening.

4,045,931

INSULATING FLEXIBLE COMPOSITE ELEMENT

Otto Alfred Becker, Robert-Koch-Strasse 59, 66 Saarbruecken 6, Germany

Division of Ser. No. 465,848, May 1, 1974, Pat. No. 3,917,471, which is a division of Ser. No. 125,549, March 18, 1971, Pat. No. 3,811,239. This application Nov. 3, 1975, Ser. No. 628,385
Claims priority, application Germany, Mar. 19, 1970, 2013115; Feb. 19, 1971, 2108110
Int. Cl.² E04B 2/36
U.S. Cl. 52—406 3 Claims



1. An insulating flexible composite element comprising

a. a pair of spaced sheets of flexible material, at least the interior surfaces of which are reflecting thereby to form a radiation chamber,

b. a flexible spacing element positioned in said chamber, said element serving to space apart said sheets of flexible material and being formed so as to provide a plurality of separate radiation chambers,

c. supporting means of net-like material positioned on either side of said flexible spacing element and serving to prevent penetration of said spaced sheets into said separate chambers of said flexible spacing element, and,

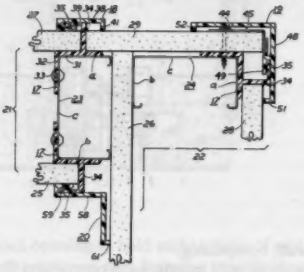
d. means for tensioning at least said flexible spacing element and said supporting means for maintaining these members in their assembled positioned thereby to preserve said radiation chambers in said flexible spacing element.

4,045,932

JOINT SYSTEM FOR WALL PANEL CONSTRUCTION

Allen Z. Bogert, Panacres, Pipersville, Pa. 18947

Filed July 8, 1976, Ser. No. 703,514
Int. Cl.² E04C 2/00
U.S. Cl. 52—460 11 Claims



1. Wall panel construction including a plurality of panels disposed in edge-to-edge relation along a junction, a framework for supporting said panels, said framework having a support stud underlying the junction of said panels and extending along the length of said junction, a receiver mounted on said support stud having a base portion confronting at least one of said panels and having a seating surface in face-to-face abutting relationship with the interior surface of said one panel along the junction edge thereof, a mounting web extending perpendicularly from said base portion disposed intermediate said panels along the length of said junction, said web projecting from said base portion a distance greater than the thickness of said panels, the end of said web outermost from said base portion having a pre-formed integral locking flange extending therefrom parallel to said base portion with its interior surface spaced from the seating surface of said base portion by a distance equal to the thickness of the panel plus a predetermined clearance, said pre-formed locking flange and the seating surface of said base portion providing a channel into which the marginal portion of one of the panels may loosely fit during assembly, and a cover element for said junction substantially coextensive in length with said receiver and having two wings respectively adapted to overlie the adjacent edges of the panels comprising the junction, one wing of said cover element having a locking channel on its undersurface adapted to receive said locking flange, said locking channel being defined between an outer wall of said cover strip and an inner locking wall substantially parallel to said outer wall, the thickness of said locking wall corresponding to said predetermined clearance so that after assembly when said locking channel is engaged with said locking flange, the space between said seating surface and said locking wall is equal to the thickness of said one panel and the marginal portion of said one panel fits tightly between said seating surface and said locking wall.

4,045,933

PREFABRICATED PANEL STRUCTURE

Joseph R. Grillo, 1815 E. 21st St., Brooklyn, N.Y. 11229

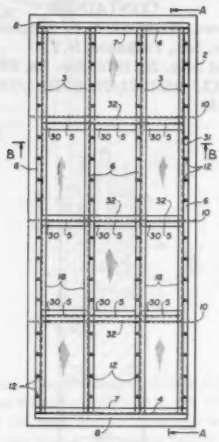
Filed June 28, 1976, Ser. No. 700,723
Int. Cl.² E04C 2/38; E04B 2/28
U.S. Cl. 52—475 3 Claims

1. A prefabricated Panel which comprises:

a. A frame for supporting facing in a prefabricated panel which comprises; substantially parallel longitudinal members, fixed at the ends by transverse end members attached to said longitudinal members and stiffened with cross braces attached to said longitudinal members, at least said longitudinal members, and transverse end members comprising metal members having a web with two substantially parallel flanges extending in opposite directions from said web and said flanges on at least one side of said

longitudinal and transverse end members being in substantial planar alignment and at least said flanges on said longitudinal members in planar alignment with said flanges on said transverse end members having holes through which means for joining said supported facing to said frame can pass.

b. one or more substantially flat rigid members which at least cover the frame and are adjacent to the flanges of the longitudinal and transverse end members which are in



substantial planar alignment, said flat rigid members having holes in alignment with the holes in the flanges of the frame adjacent thereto,

c. a stone facing member having an exposed front and a back, the back of said facing member being adjacent to said rigid member and having means extending from blind holes in the back of said facing member which pass through said holes in said rigid member and said frame to join said facing, said rigid member and said frame into a prefabricated panel.

4,045,934

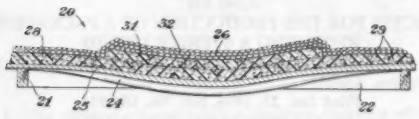
ROOF AND METHOD OF PREPARATION

James P. Sheahan, and Lowell E. Putnam, both of Worthington, Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 567,454, April 11, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 673,334

Int. Cl.² E04B *7/00, 1/66*

U.S. Cl. 52—514 **9 Claims**



1. A roof structure, the roof structure comprising in cooperative combination

a roof support means, the roof support means carrying theron

a roof deck, the roof deck supporting

a water impermeable membrane, the water impermeable membrane having a generally flat surface generally coextensive with the roof and deck,

a first layer of closed cell plastic foam insulation adjacent the membrane and remote from the deck, the membrane and first layer defining at least one generally upwardly facing cavity in which water does not drain under the influence of the force of gravity,

the improvement which comprises

at least one second layer of a closed cell plastic foam disposed within the cavity, the plastic foam of the second layer being present in a quantity sufficient to displace at least a major portion of water which would collect in the cavity under the influence of the force of gravity.

4,045,935

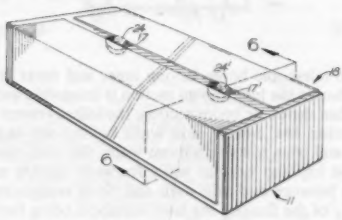
METAL CASED REFRACTORY AND METHOD OF MAKING SAME

Frank E. Morris, Collegeville, Pa., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Sept. 15, 1976, Ser. No. 723,392

Int. Cl.² E04B *5/04;* **E04C** *2/04;* **B23K** *31/02*

U.S. Cl. 52—599 **12 Claims**



1. A metal cased refractory comprising: (1) a preformed refractory shape having (a) a first face, (b) two opposed end faces adjacent the first face, and (c) two opposed side faces adjacent the first face, the first face having at least one preformed, shallow, discontinuous depression of small area compared to the area of the first face and lying wholly within a central portion of the first face, and (2) a U-shaped metal casing having (a) a central portion extending over the width of the first face between the two side faces and (b) two side legs extending a significant distance over each side face from its juncture with the first face, the central portion of the metal casing having a slot extending between the two end faces, the slot having at least one discontinuity overlying at least one depression in the first face of the refractory shape, the metal of said discontinuity being displaced from the plane of the central portion of the metal casing and disposed within the depression, whereby the metal of the central portion is placed in tension and the side legs of the U-shaped casing are held closely against the side faces of the preformed shape.

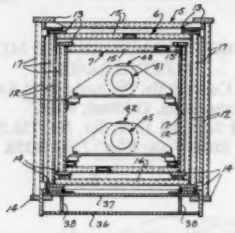
10. Method of attaching a metal casing to a refractory shape comprising: (1) forming a refractory shape with (a) a first face, (b) two adjacent opposed end faces, (c) two adjacent opposed side faces, and (d) at least one shallow discontinuous depression, small in area compared to the area of the first face, lying wholly within a central portion of the first face; (2) forming a U-shaped metal casing with (a) a central portion having two end edges and two side edges, the central portion between the two side edges being slightly wider than the width of the first face of the refractory shape between its side faces, (b) two leg portions adjacent the side edges of the central portion, the leg portions extending at least 1 cm from their junction with the central portion, and (c) at least one discontinuous slot running the length of the central portion between the two end edges; (3) placing the metal casing on the refractory shape so the central portion of the casing closely overlies the first face of the shape, the legs of the casing overly the two side faces of the shape, and at least one discontinuity in the slot overlies at least one shallow depression in the shape; and (4) depressing the discontinuity overlying the shallow depression into the depression, whereby the side legs of the metal casing are drawn closely against the side faces of the shape and the central portion of the casing is placed in tension.

4,045,936

TELESCOPIC BOOM WITH SECTIONS OF BEAM AND TRUSS CONSTRUCTION

Russell L. Sterner, South Milwaukee, Wis., assignor to Bucyrus-Erie Company, South Milwaukee, Wis.

Filed Apr. 26, 1976, Ser. No. 680,257
Int. Cl.[2] B66F 9/08; F16C 23/04
U.S. Cl. 52—632 7 Claims



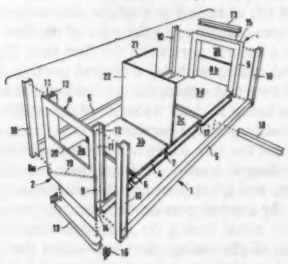
1. In a telescopic boom having inner and outer boom sections, wherein the inner boom section is extensible and retractable within the outer boom section, the improvement wherein each section has: I-beam side walls having top and bottom flanges; and truss top and bottom walls, the truss members of both said top and bottom walls for each section extending laterally between said side walls and being connected thereto interiorly of the flanges, the truss members being further connected to the interior surfaces of the flanges; and wherein the outer boom section has: a pair of bottom wear assemblies, each including a bottom wear pad in bearing engagement with one of the bottom flanges of the inner boom section; a pair of top wear assemblies, each including a top wear pad in bearing engagement with one of the top flanges of the inner boom section; and a set of side wear assemblies connected to said I-beam side walls, each including a side wear pad in bearing engagement with the exterior edge of one of the flanges of the inner boom section.

4,045,937

METHOD OF CONSTRUCTING A PREFABRICATED ROOM ELEMENT AND A BUILDING OF A PLURALITY OF SAID ELEMENTS

Fritz Christoph Stucky, Baar, Switzerland, assignor to Credelca A.G., Zug, Switzerland

Filed June 21, 1974, Ser. No. 481,917
Claims priority, application United Kingdom, June 21, 1973, 29447/73
Int. Cl.[2] E04B 1/35; E04H 1/00
U.S. Cl. 52—745 7 Claims



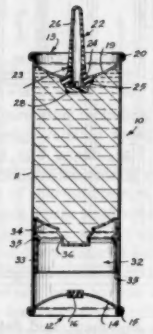
1. A method of constructing a transportable prefabricated room element comprising preparing a floor panel member having a horizontally extending channel therein, preparing a vertical structure having a vertically extending channel therein, preparing a load-bearing frame comprising a horizontal load-bearing beam and a vertical load-bearing beam, and assembling the floor panel member, the vertical structure and the load-bearing frame with the horizontal beam engaged in the horizontally extending channel and the vertical beam engaged in the vertically extending channel at a location remote from a building site to produce a transportable prefabricated room element.

4,045,938

METHOD OF FILLING BARRIER PRESSURE CONTAINER

Harold M. Hansen, Westfield, N.J., assignor to Barrier Pressure Container, Inc., Tuckahoe, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,817
Int. Cl.[2] B65B 31/09; B67D 5/38, 1/04
U.S. Cl. 53—22 R 1 Claim



1. The method of filling a barrier pressure container with a flowable viscous product, said container having a generally cylindrical body with a wide mouth open top and a piston located adjacent to the bottom of said body, comprising the steps of: positioning said body along a generally vertical axis, introducing flowable material into said container body through the open top of said body until the material reaches a predetermined level below the open top of said container, inserting a top member having a concave wall and an annular peripheral flange into the open top of said container so that the concave wall engages the material and forces the material upwardly and outwardly to exhaust substantially all of the air above the material from the container without discharging material from the container before the peripheral flange of the top member engages the container, securing the annular flange of the top to said container, and pressurizing the space below the piston to cause the piston to apply pressure against the material within said body.

4,045,939

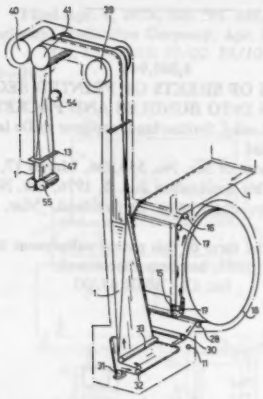
PROCESS FOR THE PRODUCTION OF A PACKAGING RECEIVING A STERILE LIQUID

Herbert Baumstingl, Tremelo, Austria, assignor to Papeteries de Belgique, Austria

Filed Jan. 23, 1976, Ser. No. 651,934
Int. Cl.[2] B65B 31/02, 55/06, 55/10
U.S. Cl. 53—22 A 4 Claims

1. A method for the production in a sole enclosure of a pack containing a sterile liquid, the method comprising a sterilization step followed by a pack forming and filling step, said sterilization step comprising filling entirely the enclosure with previously heated water to a temperature of between 120° and 150° C and at a pressure of between 3 and 5 kg/cm_2, circulating said heated water over a period of 10 to 40 minutes, replacing the hot water by sterile cold water to cool the enclosure to ambient temperature, discharging the sterile water from the enclosure and drying the enclosure by continuously blowing compressed sterile air into the enclosure at a temperature of

between 60° and 70° C, and said pack forming and filling step comprising feeding along a path through the enclosure a flexible web of pack-forming material made of at least one layer of synthetic plastics material that is weldable by pressure, continuously injecting a sterile gas into the enclosure while the web is being fed through the enclosure, sterilizing the two faces of the web, folding the web over in the enclosure to form it into



a longitudinally open tube, feeding said tube downwardly past a filling pipe means which projects into the tube through the longitudinal gap in the tube, and successively welding the tube first longitudinally and then transversely below said filling pipe means, introducing a sterile liquid into the portion of the longitudinally welded tube above said transverse weld, and separating the tube at said transverse weld to form individual liquid-containing packs.

4,045,940

BALER SYSTEM AND METHOD

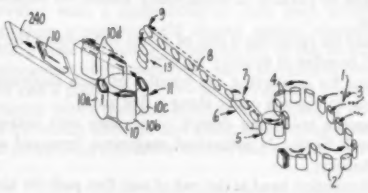
Thomas J. White, San Ramon; Henry L. Spence, Pleasanton, and Etheridge R. McClelland, Livermore, all of Calif., assignors to Filper Corporation, Reno, Nev.

Filed Sept. 21, 1972, Ser. No. 290,894

The portion of the term of this patent subsequent to Sept. 6, 1991, has been disclaimed.

Int. Cl.² B65B *35/50, 57/10*

U.S. Cl. 53—26 **19 Claims**



1. The method of packaging a uniform plurality of filled primary containers in master containers that includes the steps of:

a. moving a succession of said primary containers in arranged in a row, in one direction along a path extending longitudinally of said row to discharge point, and discharging said primary containers from said path at said point,

b. positioning an upwardly opening empty master container in a receiving position for receiving primary containers discharged from said point;

c. accumulating at an accumulating station between said discharge point and a master container in said receiving position, a predetermined number of primary containers less than said uniform plurality, as they are discharged from said point, then;

d. discharging the primary containers so accumulated at said accumulating station into the master container in said receiving position and a approximately the same time discharging directly from said discharge point past said accumulating station into said master container additional primary containers in a number to fill said master container with additional primary containers in sufficient number to make up said uniform plurality thereof.

4,045,941

METHOD AND APPARATUS FOR CASING FLEXIBLE CONTAINERS

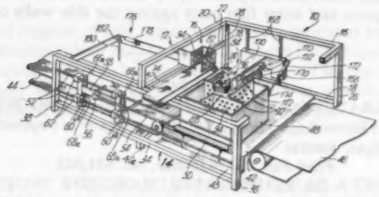
Gysbertus Flantua, Grimsby, Canada, assignor to Bonar & Bemis Ltd., Burlington, Canada

Filed Sept. 17, 1976, Ser. No. 724,136

Claims priority, application Canada, Feb. 24, 1976, 246435

Int. Cl.² B65B *5/10*

U.S. Cl. 53—35 **9 Claims**



9. A method of loading a plurality of flexible containers symmetrically in a generally rectangular open-top case comprising the steps of:

a. locating removable divider means in said case, said divider means forming a plurality of symmetrically positioned compartments in said case;

b. feeding said containers singly to laterally displacable diverter means,

c. displacing said diverter means laterally so as to overlie an empty compartment in said case;

d. releasing the container from the diverter means to fall into said empty compartment;

e. rotating said divider means and said case to bring a new empty compartment to a position adjacent said diverter means;

f. repeating said feeding, displacing, releasing and rotating steps until each compartment is full; and

g. removing said divider means from said case, leaving said containers in position in the case.

4,045,942

APPARATUS FOR FORMING A WRAPPER ABOUT A GROUP OF ARTICLES

Rolf Muller, Trier-Ehrang, Germany, assignor to The Mead Corporation, Dayton, Ohio

Filed May 10, 1976, Ser. No. 685,051

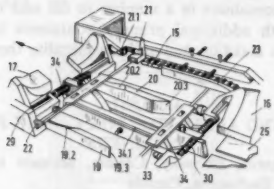
Claims priority, application Germany, May 9, 1975, 2520625

Int. Cl.² B65B *21/24*

U.S. Cl. 53—48 **4 Claims**

1. Apparatus for forming article carriers of the wraparound type having a top wall, side walls, bottom panels, end flaps foldably joined to the opposite end edges of one of said bottom panels, said end flaps being provided respectively with a pair of outer flap parts and adapted for attachment respectively to said side walls, said apparatus comprising conveyor means on which the carrier is advanced in continuous motion with said side walls of the package being disposed parallel to the direction of travel, a pair of auxiliary fold elements arranged respec-

tively to fold upwardly said end flaps, fold elements pivotally mounted respectively on rods extending transverse to the direction of travel, said rods being pivotally mounted at each end thereof on endless elements which extend parallel to the direction of travel, each of said fold elements having at least one cam follower adapted to engage a cam surface to swing



said fold elements upwardly, and wherein the improvement resides in moving said fold elements (16, 17) inwardly in a directly transverse to the direction of travel by means of second cam followers (43) secured respectively to said fold elements and controlled respectively by second cam surfaces (31, 32) to press said outer flap parts against the side walls of the carrier.

4,045,943

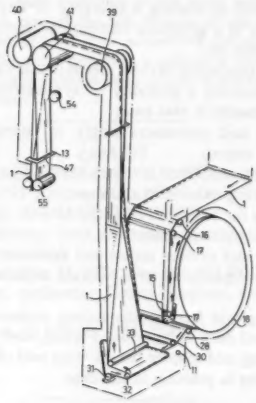
APPARATUS FOR PACKAGING STERILE PRODUCTS

Herbert Baumstingl, Tremelo, Austria, assignor to Papeteries de Belgique, Austria

Filed Jan. 23, 1976, Ser. No. 651,933

Int. Cl.[2] B65B *31/02, 55/06, 55/10*

U.S. Cl. 53—112 A **10 Claims**



1. Apparatus for conditioning a sterile liquid product in a continuous tubular pack, said apparatus comprising in a sole enclosure:

inlet slot means through which a web can be fed into the interior of the enclosure;

a receptacle containing a sterilizing bath and is provided with guides for the web in this bath and a heated rotatable drum contained in a casing concentric therewith, which drum is arranged to pick up the web from the sterilizing bath and heat the web on its inner and outer faces by direct contact and radiation respectively;

means for longitudinally folding the web to form a longitudinally open tube;

means for longitudinally welding the open tube to close the tube longitudinally;

a pipe for filling said tube with the sterile liquid product;

outlet slot means through which the filled tube can be discharged from the enclosure; and

means for continuously passing a sterile gas into the enclosure, said enclosure being capable of resisting an inter pressure of hot water at 120° C of at least 3kg/cm$_2$, bei provided with removable gasket means for tempor sealing the inlet and outlet slot means, and being provic with inlet and discharge means for said hot water enabling the interior of the enclosure to be sterilized.

4,045,944

PROCESSING OF SHEETS OF PRINTED SECURITY PAPERS INTO BUNDLES AND PACKETS

Gualtiero Giori, Lonay, Switzerland, assignor to De la Rue Gi S.A., Switzerland

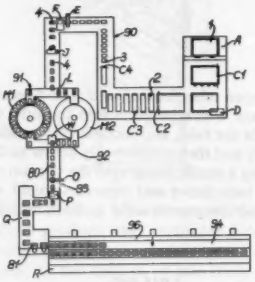
Continuation-in-part of Ser. No. 559,236, March 17, 1975, P No. 3,939,621. This application Jan. 5, 1976, Ser. No. 646,4'

Claims priority, application Switzerland, Mar. 26, 19' 4183/74

The portion of the term of this patent subsequent to Feb. 2 1993, has been disclaimed.

Int. Cl.[2] B65B *63/00*

U.S. Cl. 53—123 **14 Clai**



1. An installation for processing piles each formed of constant number of sheets each printed with N number security papers such as banknotes, in which the numbering the security papers at like positions of the successive sheets each pile and of the successive piles is in an uninterrupt sequence, into bundles of security papers each having sa constant number of security papers in sequential order ar arranged in packets of sequentially numbered bundles, cor prising:

means for receiving a pile of sheets and cutting the pile in N bundles of security papers;

means for conveying the bundles of each successively c pile in a given order along a first path;

a bundle collecting device comprising two rotary drun each having N individual magazines arranged at its p riphery;

a distribution head at the end of said first path for alternatel delivering bundles to fill one drum and then the oth drum;

means for driving the drum being filled in synchronsim wit the delivery of bundles along said first path to receive the end of the said first path successive ones of the bundles formed from each pile in successive magazines t form N packets of a given number of bundles from a give number of piles;

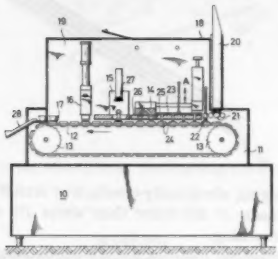
means for successively discharging said packets of bundle from said magazines of each of said drum while said maga zines of the other of said drums are being filled, and

means for conveying the successive packets of bundles dis charged from the filled drum of said collecting devic along a second path to a packet wrapping device.

4,045,945
APPARATUS FOR THE STERILE FILLING OF FOODS INTO CONTAINERS

Erwin Möller, Wuppertal-Barmen; Franz Hubert Bausch, Wuppertal-Ronsdorf, both of Germany, and Martin Frölich, Gumlingen BE, Switzerland, assignors to Firma Hamba-Maschinenfabrik Hans A. Müller, Wuppertal-Vohwinkel, Germany

Filed Apr. 9, 1973, Ser. No. 349,532
Claims priority, application Germany, Apr. 17, 1972, 2218585
Int. Cl.[2] B65B *31/02, 55/10*
U.S. Cl. 53—167 **2 Claims**



1. In an apparatus for the sterile packing of foods in cup-shape containers comprising an endless conveyor defining a transport path, a filling station along said path for depositing food in said containers, a lid-applying station downstream of said filling station along said path for applying a lid to each of the filled containers, a sealing station along said path downstream of the lid-applying station sealing the applied lid to each container, said containers after sealing of said lids being ejected from said path, the improvement which comprises:

a hood overlying said conveyor and enclosing all of said stations to define a sterile chamber;

a magazine along said path for depositing said containers on said conveyor upstream of said filling station;

spray means disposed downstream of said magazine along said path and within said chamber for spraying said containers with a sterilizing fluid; and

a drying means between said spraying means and said filling station along said path for drying the fluid in said containers, said drying means including means for blowing a gas onto said containers and radiant-heating means confronting said containers on said conveyor, said conveyor being provided with a multiplicity of cells each receiving a respective container, said drying means comprising a heating plate extending longitudinally in the direction of displacement of the conveyor over a plurality of conveyor cells and a plurality of blow nozzles spaced apart in said direction with a distance equal to the spacing of said cells and extending through said plate, said drying means further comprising means for feeding said nozzles with sterile air.

4,045,946
APPARATUS FOR CONTINUOUSLY FORMING AND FILLING TAMPON SACKS

Jean E. Schaefer, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

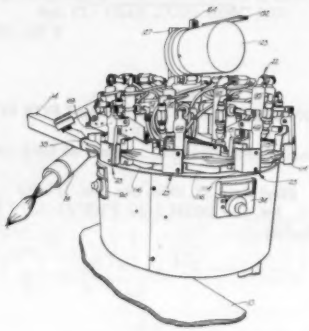
Division of Ser. No. 484,813, July 1, 1974, Pat. No. 3,982,374. This application Apr. 21, 1976, Ser. No. 678,998
Int. Cl.[2] B65B *9/12*
U.S. Cl. 53—180 M **26 Claims**

1. In apparatus for forming and filling flexible tubing to form sealed packages,

a rotatable turret, drive means for rotating said turret;

a plurality of pleating and sealing stations located at substantially equally spaced intervals about the periphery of said turret, each station including pleating means movable from an open to a closed position, and sealing means also movable from an open to a closed position; and

open-close means for sequentially closing and opening said pleating means and said sealing means during each cycle

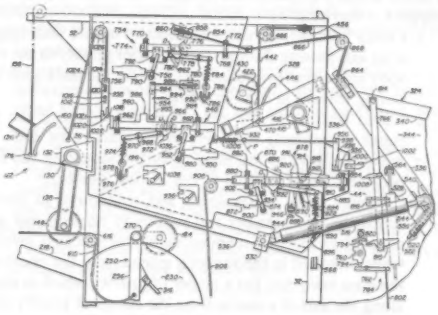


of rotation of said turret, whereby a continuous length of flexible tubing may be fed to the turret for engagement at spaced intervals by successive pleating and sealing stations and the tubing gathered and sealed at predetermined spaced intervals to form individual packages.

4,045,947
FRONT AND REAR UPPER APRONS IN A CROP MATERIAL ROLL FORMING MACHINE

Aquila D. Mast, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Feb. 9, 1976, Ser. No. 656,687
Int. Cl.[2] A01D *39/00*
U.S. Cl. 56—343 **20 Claims**



1. In a crop material roll forming machine, the combination comprising:

a mobile frame adapted to move across a field;

crop material delivery means supported by said frame;

a first upper apron assembly supported by said frame and mounted above a first portion of said delivery means, said first upper apron assembly and said first delivery means portion defining a first roll forming region;

a second upper apron assembly supported by said frame and mounted above a second portion of said delivery means, said second upper apron assembly and said second delivery means portion defining a second roll forming region; and

means to drive at least a part of said delivery means in a predetermined direction for delivering crop material from the field to said first and second roll forming regions and also to drive at least a part of each of said first and second upper apron assemblies in a direction opposite to that of

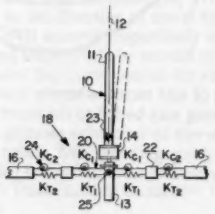
said part of said delivery means for performing roll forming operations at said regions.

4,045,948

VIBRATION ATTENUATING SUPPORT FOR ROTATING MEMBER

Alan J. Hannibal, Fairview, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Aug. 23, 1976, Ser. No. 716,868
Int. Cl.[2] D01H 7/10; F16F 15/12
U.S. Cl. 57—129 **18 Claims**



1. A support for mounting a rotating first member on a second member and for reducing the transmission of vibrations from said rotating first member to said second member, the first member being rotatable about an axis and tending while rotating to tilt about and translate along axes transverse to said axis of rotation, the first member also normally being rotated at a speed within a predetermined range of rotational speeds, said support comprising:

a. a body having mass and a moment of inertia with respect to an axis passing through the center of gravity of the mass body transverse to said axis of rotation, the mass body also having formed in it an opening;

b. means secured to the mass body for mounting the first member resiliently relatively to the mass body; and

c. means secured to the mass body for mounting the mass body resiliently relative to the second member,

the support being dimensioned and configured to circumscribe the first member and its axis of rotation and to be coupled to the first member such that the first member, when mounted in the support, extends into the opening in the mass body and has a center of gravity which is spaced along the axis of rotation from the center of gravity of the mass body,

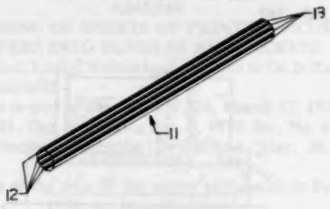
the support, when mounting the first member, predominately determining (i) a translational natural mode of vibration with an associated natural frequency at which the mass body translates in resonance along axes transverse to the axis of rotation of the first member and (ii) a cocking natural mode of vibration with an associated natural frequency at which the mass body cocks or tilts in resonance about axes transverse to the axis of rotation of the first member, the mass and moment of inertia of the mass body and the stiffnesses of the mounting means being such that both of said natural frequencies of the translational and cocking modes of vibration fall outside of a frequency range corresponding to the predetermined rotational speed range of the first member and such that at least one of said natural frequencies falls below the frequency range corresponding to the predetermined rotational speed range of the first member.

4,045,949

INTEGRAL, ELECTRICALLY-CONDUCTIVE TEXTILE FILAMENT

George A. Paton, Newport News; Sterling M. Nichols, Williamsburg, and John H. Sanders, Newport News, all of Va., assignors Dow Badische Company, Williamsburg, Va.

Continuation-in-part of Ser. No. 646,311, Jan. 2, 1976, abandoned. This application Apr. 29, 1976, Ser. No. 681,680
Int. Cl.[2] D02G 3/04, 3/44
U.S. Cl. 57—140 BY **4 Claims**



1. An integral, electrically-conductive textile filament having a resistance of not more than about 10^9 ohms/cm, the filament comprising:

a. from 2 to about 1000 electrically-conducting, longitudinally-directed strata of fiber-forming polymeric material having finely-divided particles of electrically-conductive carbon black uniformly dispersed therein, the concentration of electrically-conductive carbon black in each electrically-conducting stratum being within the following limits:

1. For2 electrically-conducting strata: from about 30 percent by weight — at a total concentration of carbon in the integral filament of about ¼ percent by weight — to about 70 percent by weight — at a total concentration of carbon in the integral filament of about ¼ percent by weight; and

2. For about 1000 electrically-conducting strata: from about 30 percent by weight — at a total concentration of carbon in the integral filament of about 12 percent by weight — to about 70 percent by weight — at a total concentration of carbon in the integral filament of about 2 percent by weight; and

b. in coextensive union with each electrically-conducting stratum along the length of at least one major surface thereof, a non-conducting stratum of the same fiber-forming polymeric material.

4,045,950

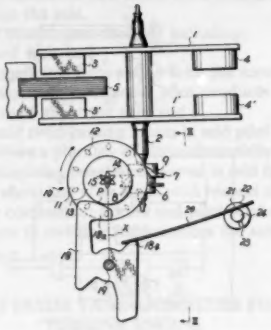
CONTROL APPARATUS FOR AN INTERMITTENTLY ROTATED WHEEL

Shoichiro Kumazawa, Kamagaya, Japan, assignor to Kabushiki Kaisha Seikosha, Japan

Filed Oct. 16, 1975, Ser. No. 623,016
Int. Cl.[2] G04C 3/00
U.S. Cl. 58—23 D **4 Claims**

1. A control device for controlling the rotation of an intermittently driven wheel comprising: a driven wheel mounted to be rotationally driven in a forward direction in a stepwise intermittent manner; a lock wheel connected to said driven wheel to be driven thereby and having a smooth non-toothed peripheral surface; a turnably mounted lock lever having a lever arm extending toward said lock wheel and terminating in an arm end portion in frictional contact with said lock wheel peripheral surface; and means including a lever spring for applying an adjustable biasing force to said lock lever tending to turn it so as to urge said arm end portion into frictional

contact with said lock wheel peripheral surface with an adjustably settable frictional bias force to thereby prevent said lock



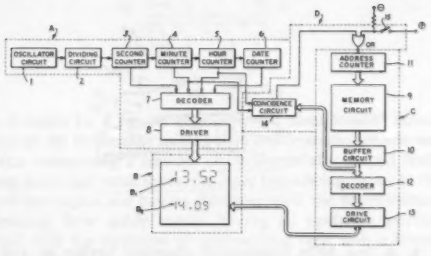
wheel and driven wheel from undergoing rotation in the reverse direction.

4,045,951

DIGITAL ELECTRONIC TIMEPIECE

Kojiro Tanaka, Yachiyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Dec. 19, 1975, Ser. No. 642,378
Claims priority, application Japan, Dec. 20, 1974, 49-147273
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 R **6 Claims**



1. A digital electronic timepiece comprising in combination:

time measuring means including an oscillator circuit for developing an output signal at a certain frequency, a dividing circuit connected to receive the oscillator output signal for developing output pulses at a frequency lower than the frequency of the oscillator output signal, and a counter connected to receive the output pulses from the dividing circuit for counting the same to develop a pulse count representative of time;

memory means having a plurality of successive addresses for memorizing time table information representative of different times and being successively addressable by a control signal for reading-out successive memorized times;

display means connected to receive the pulse count representative of time and successive times read-out from said memory means for simultaneously displaying a time represented by the pulse count and a time read-out from said memory means; and

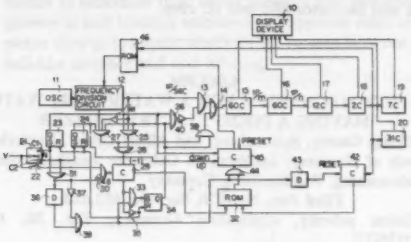
control means comprising a coincidence circuit connected to compare the pulse count with the read-out contents of said memory means for developing a control signal when the times respectively represented by the pulse count and the read-out contents of said memory means coincide, thereby to read-out a next successive time memorized in said memory means and display the same.

4,045,952

ELECTRONIC TIMEPIECE APPARATUS

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,295
Claims priority, application Japan, Mar. 8, 1975, 50-28278
Int. Cl.² G04B *27/00*; G04C *3/00*
U.S. Cl. 58—23 R **4 Claims**



1. An electronic timepiece comprising:

an oscillator for generating standard clock pulses;

electronic time counting means coupled to the oscillator for frequency-dividing and counting the clock pulses from the oscillator;

display means coupled to the electronic time counting means for indicating the time in accordance with a signal from the electronic time counting means;

memory means for storing an amount of correction by which to correct the error in the frequency of the standard clock pulses from the oscillator;

control means coupled to the electronic time counting means for adjusting the counting period of the electronic time counting means as a function of the amount of correction stored in the memory means;

actuating switch means for correcting the time;

time correction control means coupled to the actuating switch means for changing the time upon operation of the actuating switch means;

time period counting means for counting the time period between a time-correcting operation initiated by the actuating switch means and the immediately preceding time-correcting operation;

means for obtaining an amount of correction for a unit length of time based on the count value of the time period counting means and the period of time by which the time has been changed by the correction control means; and

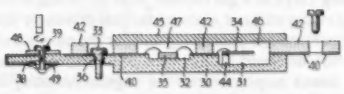
means for changing the amount of correction stored in the memory means as a function of the obtained amount of correction for a unit length of time.

4,045,953

CIRCUIT BOARD FOR AN ELECTRONIC TIMEPIECE

Joichi Miyazaki, Funabashi, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Continuation-in-part of Ser. No. 615,916, Sept. 23, 1975, abandoned. This application July 30, 1976, Ser. No. 710,199
Claims priority, application Japan, Sept. 30, 1974, 49-112490
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 R **8 Claims**



1. A circuit board assembly for an electronic timepiece comprising: a lower substrate having at least two recesses

therein; an upper substrate superposed on and connected to said lower substrate and having at least two openings in registry with respective ones of said recesses; covering means hermetically covering said openings to define at least two hermetically sealed compartments; an oscillator mounted in one of said compartments; an IC chip mounted in another of said compartments; and means defining a pattern of electrodes on at least one of said upper and lower substrates in electrical connection with said oscillator and said IC chip.

4,045,954

SAFETY MECHANISM FOR A WATERTIGHT WATCH HAVING A PIEZO ELECTRIC BUZZER

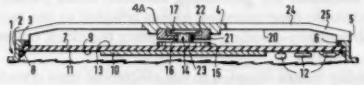
Wolfgang Ganter, Schramberg, and Albert Ginter, Lauterbach, both of Germany, assignors to Gebruder Junghans GmbH, Schramberg, Wurttemberg, Germany

Filed Jan. 29, 1976, Ser. No. 653,623

Claims priority, application Germany, Jan. 30, 1975, 7502725[U]

Int. Cl.[2] G04C *21/02, 21/34;* G04B *23/12;* G08B *3/10*

U.S. Cl. 58—38 R **7 Claims**



1. In a watch of the watertight type having housing means, including a downwardly apertured portion for transmitting sound; a diaphragm attached to said housing means in a manner effecting a watertight seal, said diaphragm being capable of flexure toward and away from said apertured housing portion; a piezo electric buzzer element secured internally of said diaphragm and being responsive to electrical excitation for producing a buzzing sound; electrical circuit means connected to said piezo element for electrically exciting said piezo element; and safety means for preventing an excessive amount of flexure of said diaphragm in response to pressure acting thereon; the improvement wherein said safety means comprises:

a first safety element secured to said diaphragm; and

a second safety element secured to said housing means;

said first safety element being movable, with said diaphragm, relative to said second safety element in an inward direction away from said apertured housing portion;

said second safety element including stop means for contacting said first safety element to limit the amount of flexure of said diaphragm.

4,045,955

REGULATING MEANS FOR GAS TURBINE PLANT

Roine Brännström, and Goran Nilsson, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden

Filed Aug. 4, 1976, Ser. No. 711,666

Claims priority, application Sweden, Aug. 29, 1975, 7509603

Int. Cl.[2] F02C *9/06*

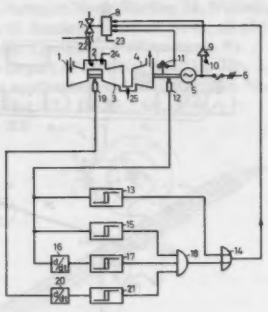
U.S. Cl. 60—39.28 R **10 Claims**

1. Apparatus for controlling the flow of fuel supplied via a regulating valve to a gas turbine plant including a compressed-gas generating unit and a power turbine driven by the gas from the compressed-gas generating unit for the purpose of reducing power turbine speed in the event of overspeed comprising:

first means responsive to the angular velocity of a rotor included in said power turbine,

second means responsive to the angular acceleration of the power turbine rotor,

and third means jointly responsive to output signals provided by said first and second means for controlling said valve to reduce the rotor's angular velocity when said



output signals provided by both said first and second means concurrently exceed predetermined values.

4,045,956

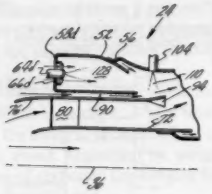
LOW EMISSION COMBUSTION CHAMBER

Stanley J. Markowski, East Hartford, and James J. Nolan, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 533,922, Dec. 18, 1974, Pat. No. 3,973,395. This application Mar. 26, 1976, Ser. No. 670,914

Int. Cl.[2] F02C *7/22*

U.S. Cl. 60—39.65 **6 Claims**



1. A low NOx combustion chamber having an axis and comprising:

A. means to produce pilot combustion swirling about said axis and similarly swirling hot, fully combusted, pilot exhaust gases of reduced oxygen content and of a temperature above the vaporization temperature of the fuel to be utilized in the combustion chamber,

B. means to inject atomized fuel into the swirling pilot products of combustion in selected quantity to produce a first swirling mixture of fuel and air of reduced oxygen content so that the first swirling mixture has a first ignition delay time to prevent autoignition of the atomized fuel droplets, said first swirling mixture also having a selected temperature to vaporize the fuel so that said first swirling mixture is a vaporized, swirling fuel-air mixture having a reduced oxygen content to produce autoignition at the culmination of the first time delay,

C. means to mix a selected quantity of swirling combustion air with the first swirling mixture to effect molecular mixing between the fuel and air since both the first mixture and combustion air are swirling, and in selected quantity to produce a second swirling, vaporized fuel-air mixture of oxygen level greater than that of said first mixture to effect a new and reduced ignition delay time so as to autoignite the second mixture at an ER less than one and at a time sooner than the expiration of the first ignition delay time to thereby reduce the dwell time of the engine air at NOx creating temperature,

D. said combustion chamber having an axis and a pilot combustion chamber axially upstream of a main combustion chamber and wherein the first and second mixtures swirl concentrically about the axis,

E. said pilot combustion chamber including:

1. a forward wall, and
2. means operatively associated with the forward wall to cause pilot combustion and pilot products of combustion to swirl about the axis, and

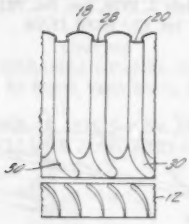
F. wherein said swirl causing means in said pilot combustion chamber comprises a plurality of circumferentially spaced and disposed fuel atomizing nozzles supported in said forward wall concentrically about and at an angle with respect to the axis so that pilot zone combustion occurs and pilot products of combustion will flow in swirling fashion about the axis.

4,045,957

COMBINED GUIDE VANE AND MIXER FOR A GAS TURBINE ENGINE

Vincent J. DiSabato, Southington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 20, 1976, Ser. No. 659,889
Int. Cl.² F02K 3/06
U.S. Cl. 60—262 **5 Claims**



1. A mixer for a fan jet engine power plant located downstream of the turbine for mixing the flow from the turbine and the fan, comprising a sinuous circumferentially shaped body having inner and outer lobes, the inner lobes being closer to the axis of the engine and having a bottom wall, the improvement comprising flow guide means having an upstream portion aligned with the direction of approaching flow and, a downstream portion to circumferentially turn the flow, the flow guide means disposed adjacent the bottom wall extending within the body of the mixer to turn the flow exhausting from said turbine in a predominantly circumferential direction whereby the turning of the turbine exhaust is accomplished within the mixer prior to being mixed with the fan discharge air flow.

4,045,958

MULTI-DIRECTIONAL POSITIONER

William M. Wells, Midfield, Ala., assignor to Thomas H. Hudson, Birmingham, Ala., a part interest

Filed Ma. . 25, 1976, Ser. No. 670,571
Int. Cl.² F01C 9/00; F15B 7/00
U.S. Cl. 60—325 **7 Claims**

1. In a multi-directional positioner for moving one element relative to another element,

a. a ball-like member,

b. housing having a socket therein receiving said ball-like member with a rotating fit with the inner surface of said socket extending an angular distance around said ball-like member to retain said ball-like member in said socket with a portion of said ball-like member projecting outwardly of said socket,

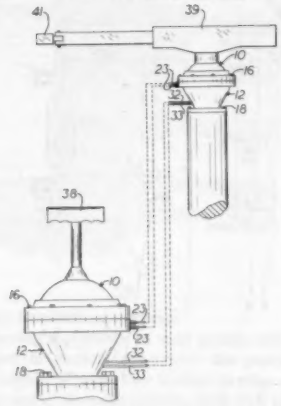
c. means operatively connecting said portion of the ball-like member projecting outwardly of said socket to said one element,

d. means operatively connecting said housing to said another element,

e. at least one arcuate groove in the inner surface of said housing extending in a plane passing generally through the center of said ball-like member,

f. a piston in said arcuate groove in said housing and pivotally connected to the adjacent side of said ball-like member,

g. means to introduce fluid under pressure into said arcuate groove in said housing selectively at opposite sides of the piston therein to impart relatively movement between said ball-like member and said housing,



h. at least one arcuate groove in the outer surface of said ball-like member extending in a plane passing generally through the center of said ball-like member and perpendicular to said arcuate groove in the inner surface of said housing,

i. a piston in said arcuate groove in the outer surface of said ball-like member and pivotally connected to the adjacent portion of said housing, and

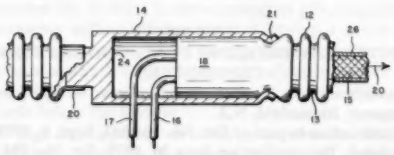
j. means to introduce fluid under pressure into said arcuate groove in the outer surface of said ball-like member selectively at opposite sides of the piston therein to impart relative movement between said ball-like member and said housing.

4,045,959

EXPANDED RING BELLOWS

Dallas D. Burns, Brooklyn Park, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 17, 1975, Ser. No. 559,289
Int. Cl.² F01B 19/08, 29/08
U.S. Cl. 60—632 **4 Claims**



1. A self-erecting structure, comprising:

a plurality of unexpanded convoluted bellows means joined together sequentially defining an enclosed tubular ring having an interior circular path and a first diameter; and activation means for generating sufficient pressure within

said enclosed path to increase said first diameter to a second diameter of significantly greater size.

4,045,960

PROCESS FOR PRODUCING ENERGY

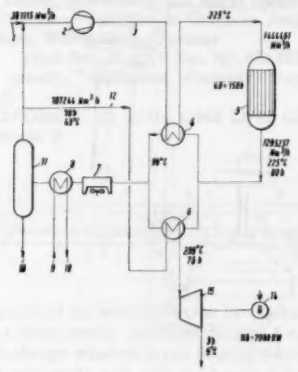
Gerhard Cornelius, Bergen-Enkheim; Friedemann Marschner, Oberursel; Emil Supp, Dietzenbach, and Toma Varlam, Neu-Isenburg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 9, 1976, Ser. No. 647,965

Claims priority, application Germany, Jan. 15, 1975, 2501377

Int. Cl.² F01K *17/00*

U.S. Cl. 60—648 **5 Claims**



1. Process of recovering energy from a residual gas from a catalytic synthesis of methanol, comprising the steps of:

a. reacting a gaseous mixture having a temperature in the range of 190°–280° C and containing hydrogen and carbon oxides in a methanol synthesis zone in the presence of a catalyst at a pressure of 25–150 bars and producing a methanol containing product gas,

b. cooling said product gas by indirect heat exchange,

c. in a separation zone, separating methanol from the cooled product gas,

d. withdrawing from said separation zone residual gas containing hydrogen, carbon oxides and methane and having a pressure of 25–150 bars,

e. mixing a first partial stream of said residual gas and fresh synthesis gas and feeding the mixture into said catalytic synthesis of methanol,

f. withdrawing a second partial stream of said residual gas and heating it to a temperature of 50°–500° C and

g. feeding the heated second partial stream of step (f) to an expansion turbine for a partial expansion with the performance of work.

4,045,961

CONTROL OF FREEZING IN AIR-COOLED STEAM CONDENSERS

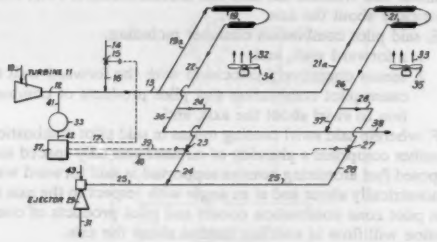
Willem Schoonman, Wyckoff, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Continuation-in-part of Ser. No. 504,243, Sept. 9, 1974, abandoned. This application June 30, 1975, Ser. No. 591,677

Int. Cl.² F28B *11/00*

U.S. Cl. 60—686 **20 Claims**

1. A method of controlling the operation of an air-cooled steam condenser having a plurality of heat exchanger tubes comprising causing non-condensible inert gas to accumulate in a portion of the condenser tubes for a predetermined time and in a predetermined amount sufficient under the conditions present in the condenser to substantially lower the heat transfer



capacity but insufficient to allow damage to occur to the condenser from freezing of condensate therein.

4,045,962

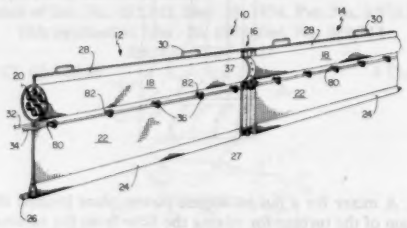
CABLE CONNECTOR ASSEMBLY FOR OIL CONTAINMENT BOOM

Paul Preus, 21 Smith Road, Toms River, N.J. 08753

Filed July 2, 1976, Ser. No. 702,066

Int. Cl.² E02B *15/04*

U.S. Cl. 61—1 F **2 Claims**



1. A barrier for water carried pollutants comprising a series of end-to-end connectable boom sections, each boom section comprising a flexible tubular sleeve containing flotation means and a depending skirt, flexible draft members extending along each side of the skirt immediately below the tubular sleeve and means connecting the flexible draft members to the boom at spaced intervals characterized in that the connecting means comprises a pair of U-shaped anchor shackles, adapted to receive a threaded anchor pin at the extended ends of the legs thereof, a boss on the bridge portion of each shackle having an opening therein, the axis of which lies in a plane parallel to the longitudinal axes of the legs of each of the U-shaped shackles, internal threads in the openings in each boss, a connector bar having threads at both ends compatible with threads in the pair of bosses and openings through the skirt of the boom to snugly receive the connector bar.

4,045,963

UNDERGROUND INSTALLATION FOR STORING PETROL PRODUCTS

Bengt Hansson, Sollentuna, and Sigfrid Svensson, Goteborg, both of Sweden, assignors to Armerad Betong Vägförbättringar Aktiebolag, Stockholm, Sweden

Filed May 24, 1976, Ser. No. 689,378

Claims priority, application Sweden, May 28, 1975, 7506113

Int. Cl.² B65G *5/00*

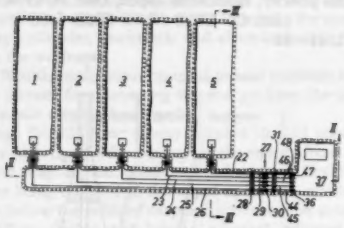
U.S. Cl. 61—.5 **7 Claims**

1. An installation for storing petrol products comprising:

a plurality of underground storing rooms (1–5) for the petrol products,

an underground pump chamber (37) filled with oil and containing at least one submersed pump,

a dry underground valve chamber (27) disposed between the storing rooms (1–5) and the underground pump chamber (37) and containing valves (30),



inlet pipes (22–26) connecting the storing rooms (1–5) to the inlets of said valves (30), and

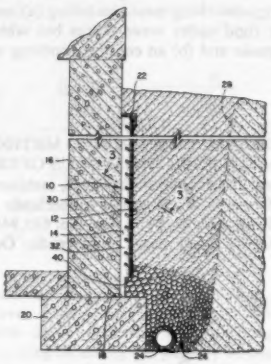
at least one outlet pipe (44–48) connecting the outlets of said valves (30) with said underground pump chamber (37).

4,045,964

SUBTERRANEAN PANEL DRAIN

James A. Barclay, 82 Buena Vista Drive, Dobbs Ferry, N.Y. 10522

Filed Dec. 15, 1975, Ser. No. 640,848
Int. Cl.² E02B 11/00; E02D 31/02
U.S. Cl. 61—11 10 Claims



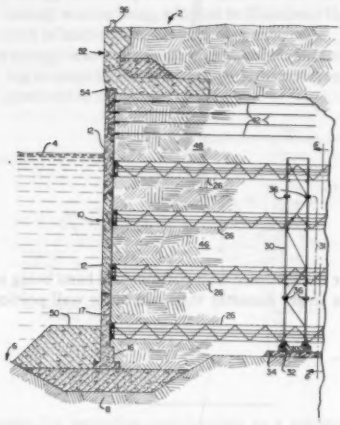
1. A subterranean panel drain comprising a unitary member having a top edge, a bottom edge, and first and second sides, said unitary member having a transverse cross-section defining a plurality of alternately disposed ridges and valleys on said first side and said second side respectively, the ridges on said first side corresponding to the valleys on said second side and the ridges on said second side corresponding to the valleys on said first side, said valleys defining a plurality of substantially vertically disposed fluid-flow channels extending between said top edge and said bottom edge, and a plurality of openings disposed in said ridges on said first side to communicate with the corresponding channels on said second side, said openings being inclined upwardly from said first side to said second side, said unitary member being adapted for subterranean installation whereby water in soil adjacent said first side is capable of flowing through said openings, entering said corresponding channels on said second side, and being directed along said corresponding channels toward said bottom edge of said member.

4,045,965

QUAY STRUCTURE

Henri C. Vidal, Paris, France

Filed June 26, 1975, Ser. No. 590,730
Int. Cl.² E02D 5/00
U.S. Cl. 61—39 20 Claims



1. A quay structure comprising:

a wall having a plurality of wall panels, said panels being arranged in vertical rows with the panels in adjacent rows, engaging each other in edge to edge relation with a tongue and groove connection, each wall panel including

a plurality of rigid framework truss members attached at one end to each of said wall panels, said truss members extending in substantially parallel relation away from one side of said wall,

rigid framework tower means for providing a plurality of vertically spaced supports, said tower means being spaced from said wall on said one side and including means for supporting the tower means of an adjacent wall panel, said truss members being supported on said tower supports in spaced relation to each other; and

particulate material substantially filling the space between said tower means and said one side of said wall, and surrounding said truss members and said tower means.

4,045,966

CASINGLESS PILE METHOD AND APPARATUS

Fredric Rusche, 30303 Beck Road, Wixom, Mich. 48096

Filed Oct. 14, 1975, Ser. No. 621,682
Int. Cl.² E02D 5/36
U.S. Cl. 61—53.64 5 Claims

1.

A mandrel for forming in situ a casingless pile, comprising,

an elongate hollow tubular mandrel having a lower end portion with an outer wall portion adapted to engage the sides of a bore hole and having an inflatable bladder surrounding the mandrel below said outer wall portion,

a nozzle below the bladder,

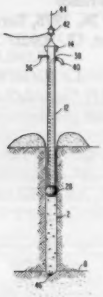
an air pipe for supplying air under pressure to the bladder,

a conduit for supplying concrete under pressure to the nozzle,

said inflatable bladder comprising an elastomeric band surrounding said mandrel below said outer wall portion,

and a rigid annular pressure plate between said band and said nozzle for protecting the lower end of said band when the mandrel is inserted in a bore hole,

the diameter of said band, when deflated, being less than the



diameter of said outer wall portion, said band being inflatable to a larger diameter than said outer wall portion.

4,045,967

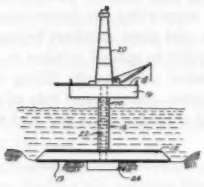
APPARATUS FOR SUPPORTING A DRILLING PLATFORM ON THE OCEAN FLOOR

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Continuation-in-part of Ser. No. 458,986, April 8, 1974, Pat. No. 3,996,756. This application Feb. 17, 1976, Ser. No. 658,224

Int. Cl.² E02B *17/00*; E02D *27/04*

U.S. Cl. 61—86 **4 Claims**



1. A mounting structure for anchoring a monopod drilling platform to the ocean floor, comprising an open precast vessel having a bottom wall and a side wall extending up from and around the perimeter of the bottom wall, the side wall terminating in a continuous edge at the top lying in a plane, the top edge of the wall forming an opening in the top of the vessel, a monopod drilling structure having a base and a supporting column extending upwardly from the base, the column having a vertical passage opening through the bottom of the base, the base having a flat bottom surface surrounding the opening of the vertical passage, the opening of the passage being substantially smaller than the opening in the top of the vessel, the vessel being adapted to be submerged in the ocean floor with the bottom of the platform base extending across the top edge of the vessel, and sealing means secured to the vessel adjacent the top edge of the vessel and frictionally engaging the bottom of the platform to form a water-tight intersection while permitting lateral movement of the platform relative to the vessel to position the vertical passage over any selected portion of the open vessel.

4,045,968

OFFSHORE PLATFORM AND METHOD FOR ITS INSTALLATION

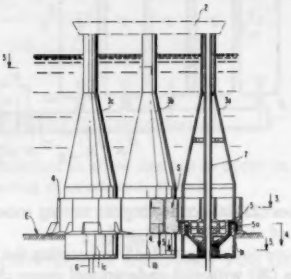
Benjamin C. Gerwick, Jr., Oakland, Calif., assignor to Kajima Corporation, Tokyo, Japan

Filed Dec. 24, 1975, Ser. No. 644,017

Claims priority, application Japan, Dec. 24, 1974, 49-147594

Int. Cl.² E02B *17/00*; E02D *5/00*

U.S. Cl. 61—86 **12 Claims**



1. A concrete platform for use in offshore drilling and the like, comprising a superstructure and a base structure, said superstructure including a deck and supporting towers, said base structure including a base raft and caissons, said caissons extending downwardly from the base raft to be embedded in the soil of the sea floor layer whereby external horizontal forces acting on the platform are opposed by soil pressure acting laterally on the sunken portions of the caissons, energy absorbing means interconnecting said caissons and said base raft, said energy absorbing means including (a) members which are relatively rigid under wave forces but which fail under strong earthquake and (b) an energy-absorbing resilient (elastic) material.

4,045,969

SUBMERGIBLE PILE DRIVING METHOD AND APPARATUS FOR CONTINUOUS OPERATION

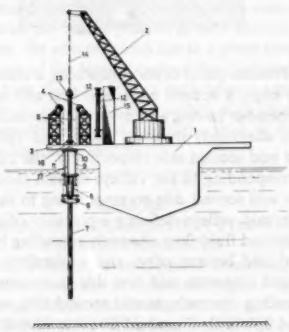
Joost W. Jansz, The Hague, Netherlands, assignor to Hollandsche Beton Groep N. V., Rijswijk, Netherlands

Filed Apr. 30, 1976, Ser. No. 681,944

Claims priority, application Netherlands, Oct. 13, 1975, 7512023

Int. Cl.² E02D *7/00*

U.S. Cl. 61—535 **9 Claims**



1. In an apparatus for underwater pile driving at substantial depths including a ship having a lifting device and cable handling means, a submersible subframe, means for suspending the subframe from the lifting device, cables connected to a pile to be driven and running down from the cable handling means,

and a pile driving head guided on the cables and vertically reciprocable in the subframe, the improvements characterized by:

a. the means for suspending the subframe comprising a string of connected, substantially rigid tube sections, said means for suspending the subframe minimizing twisting of the subframe and pile driving head,

b. a plurality of conduits secured to the string for communicating hydraulic, pneumatic and electrical energy to and from the subframe.

c. first flexible hose means coupled to said conduits at lower ends thereof for conveying the energy from the conduits to the pile driving head, and

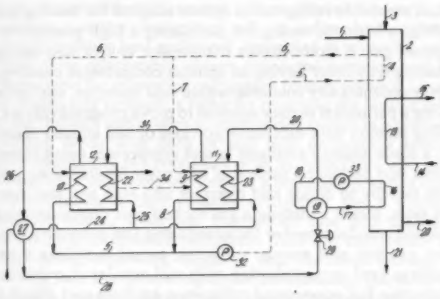
d. second flexible hose means coupled to said conduits at upper ends thereof for conveying the energy from sources on the ship to the conduits, said second flexible hose means being coupled to the upper end of the conduits at a point below the point of suspension of the tube string from the lifting device and having a length adapted to the length of the pile to be driven.

4,045,970

METHOD AND APPARATUS FOR THE INDIRECT COOLING OF HOT GASES, PARTICULARLY, COKE OVEN GASES

Kurt Tippmer, Recklinghausen, Germany, assignor to Firma Carl Still Recklinghausen, Germany

Filed Oct. 15, 1976, Ser. No. 732,958
Claims priority, application Germany, Oct. 21, 1975, 2547034
Int. Cl.² F25D *17/06, 17/02;* F25B *7/00*
U.S. Cl. 62—95 **6 Claims**



1. A method for the indirect cooling of hot gases, particularly, coke oven gases, using a gas cooler having a cooling chamber with three different heat exchangers arranged therein, comprising directing the gases to be cooled through a first heat exchanger in the gas cooler while circulating a coolant through the first heat exchanger which comprises a cooling medium taken from the desorber stage of an absorber-desorber-type refrigerating machine, thereafter directing the gases through a second heat exchanger while cooling water is circulated through the heat exchanger and finally directing the gases through a third heat exchanger while circulating a cooling agent taken from the evaporator stage of the refrigerating machine.

4,045,971

FROST DETECTOR

George John Brenner, Jr., Kirkwood, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Mar. 1, 1976, Ser. No. 662,376
Int. Cl.² F25D *21/02*
U.S. Cl. 62—140 **14 Claims**

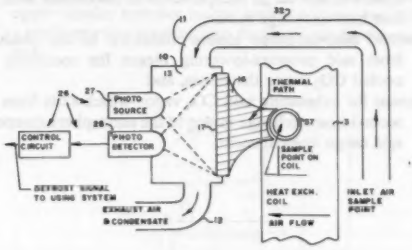
1. A frost detector for a refrigeration device having an evaporating coil, comprising:

a housing, said housing having a light impervious passageway through it, said housing including at least one side wall partially defining said passageway, said side wall having an opening in it;

a thermal conductive means mounted in said opening, said conducting means having a first surface area closing the opening in said passageway, and a second surface area;

an energy source operatively mounted to said housing, said energy source being adapted to illuminate the first surface area of said thermal conducting means;

an energy sensitive device operatively mounted to said housing to sense the level of energy reflected from said thermal conductive means;



means for mounting said housing to a refrigerant carrying portion of said refrigeration device along the second surface of said thermal conducting means, the thermal resistance between the second surface of said thermal conducting means and the refrigerant carrying portion of said refrigeration device being adjustable to vary the heat transfer characteristic of said thermal conducting means; and

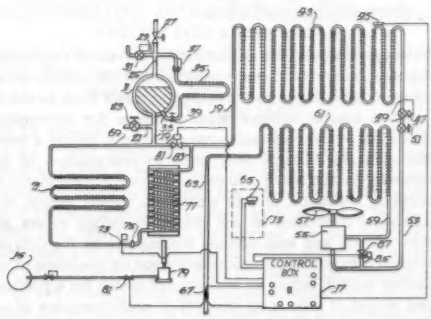
means for operatively connecting said light impervious passageway to a source of air, said connecting means being positioned so that the air pressure drop across said evaporating coil forces air through said light impervious passageway.

4,045,972

CO_2 COOLING OF VEHICLES

Lewis Tyree, Jr., 145 Briarwood Ave., North, Oak Brook, Ill. 60521

Filed July 23, 1976, Ser. No. 708,268
Int. Cl.² F25D *21/06*
U.S. Cl. 62—156 **13 Claims**



1. A system for cooling the cargo compartment of a refrigerated vehicle using CO_2, which system comprises a vessel carried by the vehicle for holding liquid CO_2, means for filling said vessel with liquid CO_2,

first heat-exchanger means for vaporizing said liquid CO_2 and warming said CO_2 vapor,

conduit means for supplying liquid CO_2 from said vessel to said first heat-exchanger means,

means for lowering the pressure of said warmed CO_2 vapor to about atmospheric pressure without the creation of solid CO_2 and simultaneously cooling said CO_2 vapor, which pressure-lowering means includes a gas-driven motor through which said CO_2 vapor is passed,

pressure-regulation means for maintaining a minimum vapor pressure of at least about 80 psia between said first heat-exchange means and said pressure-lowering means,

fan means connected to said motor for circulating the atmosphere in said cargo compartment in association with said first heat-exchange means,

second heat-exchange means connected to the discharge from said pressure-lowering means for receiving said cooled CO_2 vapor therefrom, and

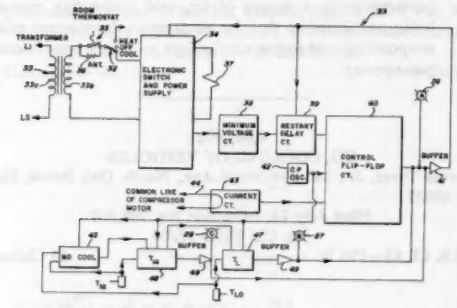
means for exhausting said CO_2 vapor which exits from said second heat-exchange means to the atmosphere exterior of said cargo compartment.

4,045,973

AIR CONDITIONER CONTROL

Richard M. Anderson, Smyrna; Robert S. McGill, III, Murfreesboro, and Robert W. Ramsey, Nashville, all of Tenn., assignors to Heil-Quaker Corporation, Lewisburg, Tenn.

Filed Dec. 29, 1975, Ser. No. 645,285
Int. Cl.² F25B 49/00
U.S. Cl. 62—158 **31 Claims**



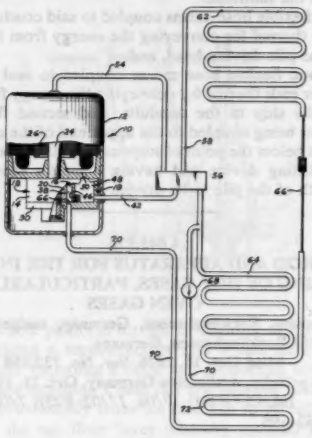
1. A control system for an electrically driven air conditioner refrigerant compressor comprising: electronic switch means for controlling energization of said compressor from an electrical power source; voltage sensing means for determining whether the voltage of said power source is below a preselected minimum voltage only prior to energization of said compressor by said electronic switch means; control means for controlling operation of said electronic switch means; time delay means connected to said electronic switch means, said control means, and said voltage sensing means for delaying attempted energization of said compressor by operation of said electronic switch means by said control means for a predetermined period of time as an incident of each operation of said electronic switch means to de-energize said compressor and as an incident of each determination of a voltage below said preselected minimum voltage; and current sensing means for causing said control means to de-energize said electronic switch means in the event the current drawn by said drive motor exceeds a preselected level after a preselected short time following energization of said compressor.

4,045,974

COMBINATION MOTOR COOLER AND STORAGE COIL FOR HEAT PUMP

William J. McCarty, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Aug. 11, 1976, Ser. No. 713,439
Int. Cl.² F25B 41/00
U.S. Cl. 62—196 B **2 Claims**



1. A reversible refrigeration system adapted for heating and cooling, a hermetic casing for containing a high pressure refrigerant gas, a motor-driven compressor unit in said casing including a cylinder having an annular compression chamber, a rotor eccentrically rotatable within said chamber, said rotor having a peripheral surface adapted to move progressively into sealing relation with successive portions of said annular chamber, a blade slidably arranged in said compressor being biased against said peripheral surface of said rotor for following said rotor thereby to divide said chamber into high and low pressure sides, means including a gas suction port communicating with said annular chamber for introducing low pressure refrigerant gas into said annular chamber, means including a gas discharge port communicating with said annular chamber for conducting hot compressed refrigerant gas from said chamber into said hermetic casing, an indoor heat exchanger and an outdoor heat exchanger connected in reversible refrigerant flow relationship, means connected between said heat exchangers for expanding refrigerant from condenser pressure to evaporator pressure, means for reversing the flow of refrigerant through said system to operate each of said heat exchangers interchangeably as a condenser or as an evaporator, a refrigerant injection passageway in said compressor communicating with said compressing chamber being adapted to be covered and uncovered by said rotor during the rotation thereof, wherein the improvement comprises:

a conduit having one end connected at some point between said reversing valve and said outdoor coil and having its other end connected to said injection passageway;

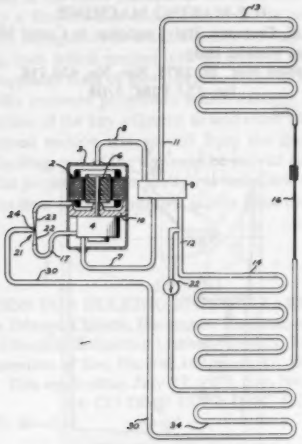
a one-way refrigerant pressure responsive valve arranged in said conduit being operable when said outdoor coil is operating as a condenser due to higher refrigerant pressure being present on the condenser side of said one-way valve relative to the pressure in said injector passageway for permitting a regulated portion of refrigerant flow to enter said conduit and be injected into said compression chamber through said injection passageway to lower the temperature of said refrigerant being compressed so that said refrigerant discharged into said casing is at a temperature sufficient for cooling said motor and to maintain its temperature within operating limits.

4,045,975

COMBINATION MOTOR COOLER AND STORAGE COIL FOR HEAT PUMP

William J. McCarty, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Aug. 11, 1976, Ser. No. 713,438
Int. Cl.[2] F25B *41/00*
U.S. Cl. 62—196 B 4 Claims



1. A reversible refrigeration system adapted for heating and cooling, a motor compressor unit, an indoor heat exchanger and an outdoor heat exchanger connected in reversible refrigerant flow relationship, means connected between said heat exchangers for expanding refrigerant from condensor pressure to evaporator pressure, a valve for reversing the flow of refrigerant through said system to operate said system in a heating or cooling mode with each of said heat exchangers arranged interchangeably as a condenser or as an evaporator, said motor compressor unit being mounted in a hermitically sealed casing for containing a high pressure refrigerant gas, a discharge passage leading from said compressor into said casing for conducting compressed refrigerant from said compressor into said casing, aspirating means in said discharge passage for creating a low pressure region in said discharge gas stream as it passes through said aspirating means, wherein the improvement comprises:

a conduit having one end connected at some point between said reversing valve and said outdoor coil and having its other end connected to said aspirating means;

a one-way refrigerant pressure responsive valve arranged in said conduit being operable when said outdoor coil is operating as a condenser due to higher refrigerant pressure being present on the condenser side of said one-way valve relative to the pressure on the aspirator side thereof for permitting a regulated portion of refrigerant flow to enter said conduit and be injected by action of said aspirating means into said compressed refrigerant passing through said discharge passage to lower the temperature of said compressed discharge refrigerant entering said casing.

4,045,976

VALVE FOR SOFT ICE CREAM MACHINE

John W. Mills, 301 S. Idaho, Columbus, Kans. 66725

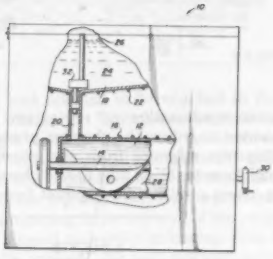
Filed Feb. 26, 1976, Ser. No. 661,760
Int. Cl.[2] A23G *9/00*
U.S. Cl. 62—308 9 Claims

1. In an apparatus for freezing and dispensing a confectionery product, the apparatus comprising a freezing chamber, a liquid product reservoir located above the freezing chamber, and a tubular communicating line between the liquid product reservoir and the freezing chamber, an improved airmix feeding element for controlling the flow of air and liquid product through the tubular communicating line comprising:

a. a lower tubular member snugly yet removably received within the tubular communicating line,

b. an air-retaining chamber fixed to an upper portion of the lower tubular member and communicating therewith,

c. an upper tubular member fixed to the air-retaining chamber and extending upward to a point above the maximum anticipated level of the liquid product in the liquid product resivoir, the lower end of the upper tubular member extending somewhat inside the air-retaining chamber, the upper tubular member having near the lower end thereof a small aperture opening into the liquid product reservoir, and



d. a checkvalve attached to the lower end of the upper tubular member for retaining air in the air-retaining and freezing chambers to assure the desired overrun in the resultant dispensed food product, the checkvalve comprising an elastomeric sleeve fixed to the lower end of the upper tubular member and a flat place disposed within the elastomeric sleeve, the flat plate being of such a size and being arranged such that the elastomeric sleeve is laterally stretched to form a pair of lip-like portions sealingly engaging the interstitial flat plate.

8. A checkvalve for retaining air in the freezing chamber of an apparatus for freezing and dispensing a frozen confectionery product, the checkvalve comprising an elastomeric sleeve and a flat plate disposed within the elastomeric sleeve the flat plate being of such a size and being arranged such that the elastomeric sleeve is laterally stretched to form a pair of lip-like portions sealingly engaging the interstitial flat plate.

4,045,977

SELF OPERATING EXCESS REFRIGERANT STORAGE SYSTEM FOR A HEAT PUMP

James W. Oliver, Jr., Staunton, Va., assignor to Dunham-Bush, Inc., West Hartford, Conn.

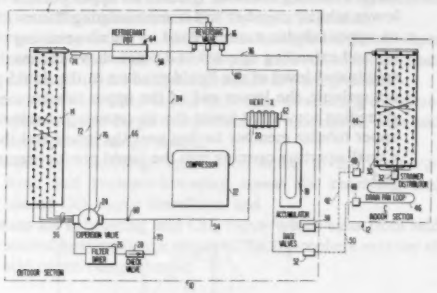
Filed Sept. 9, 1976, Ser. No. 721,928
Int. Cl.[2] F25B *13/00*
U.S. Cl. 62—324 2 Claims

1. In a heat pump closed loop refrigeration and heating system including an indoor coil, an outdoor coil, a compressor and conduit means connecting the indoor coil and the outdoor coil in series and defining a closed loop, a mass of refrigerant within said closed loop, a compressor for compressing the refrigerant, and a reversing valve within said closed loop for reversing the direction of flow of refrigerant between said indoor and outdoor coils, and expansion means for said coils to permit one of said coils to selectively act as an evaporator coil and the other as a condenser and vice versa, the improvement comprising:

a refrigerant pot surrounding a portion of said conduit means connecting said outdoor coil and said reversing valve and forming a closed chamber in heat exchange relation to said conduit means, and

a small diameter bleed tube connecting said refrigerant pot

to said conduit means connecting said indoor coil to said outdoor coil at a point upstream of said expansion means; whereby, during the heating cycle, relatively cool refrigerant passing from said outdoor coil to said reversing valve through said conduit means within said refrigerant pot



causes condensation of refrigerant vapor within said chamber to reduce the chamber pressure such that liquid refrigerant migrates from said conduit means through small diameter bleed tube to said chamber thereby removing excess condensed refrigerant from said system.

4,045,978

HOT-GAS RECIPROCATING MACHINE

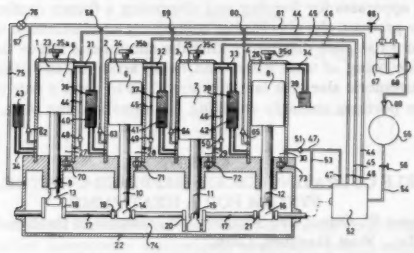
Jacobus Hubertus Abrahams; Joannes Jacobus Maria Collette, and Robertus Aloysius Tarcisius Johannes Walters, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 582,352, May 30, 1975, abandoned. This application June 2, 1976, Ser. No. 692,126

Claims priority, application Netherlands, June 14, 1974, 7407951

Int. Cl.² F02G *1/04, 1/06*

U.S. Cl. 60—521 **8 Claims**



2. In a hot-gas reciprocating machine operable with a source of pressurized working medium, and including a housing defining therein a plurality of working spaces with a piston in each of said spaces, the pistons being reciprocated at a variable rate and at a predetermined phase difference relative to each other, and means selectively for supplying working medium from said source to said working spaces, and for removing working medium from said working spaces, respectively for increasing and decreasing the mean pressure of the medium in said working spaces, the improvement in combination therewith of a control member for controlling the flow of said medium to and from said plurality of working spaces, comprising a housing including an inlet communicating with said source of working medium, a plurality of outlets, each communicating with one of said working spaces, a rotor rotatable in said housing, means for rotating said rotor at a rate corresponding to said reciprocation of said pistons, said rotor also being movable between first and second axial positions, first valve means operable by said rotor when in its first position, for communicating said inlet duct successively with one at a time of said outlet ducts corresponding to the phase difference of said pistons, and second valve means operable by said rotor in its second position, for communicating said inlet duct continuously with all of said working spaces at once.

4,045,979

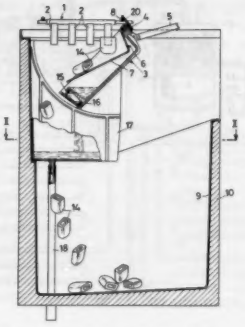
ICE-MAKING MACHINE

Leone Mazzini, Cremona, Italy, assignor to Castel Mac S.p.A., Castelfranco Veneto, Italy

Filed Nov. 28, 1975, Ser. No. 636,116

Int. Cl.² F25C *5/08*

U.S. Cl. 62—352 **3 Claims**



1. In ice-making machine having a cooling circuitry connected to freezing elements immersed in a water-containing tub tiltable about a horizontal shaft, an actuating mechanism adapted to bring the tub from a horizontal position wherein the freezing elements are active to a tilted position wherein the cooling action is stopped after the formation of ice cubes or slugs around said elements, and a reservoir arranged beneath the tub, a device for deflecting ice cubes into said reservoir comprising

an ice cube deflecting baffle arranged between the tub bottom and the freezing elements and adapted to deflect the ice over one end wall of said tub and towards the underlying reservoir, when said tub is in its tilted position, and

a water manifold provided adjacent said one end wall of the tub for collecting and preventing water from said tub from entering said reservoir when said tub is in its tilted position.

4,045,980

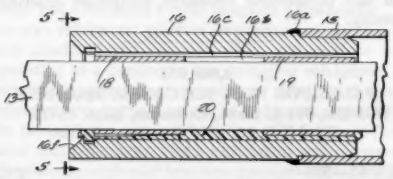
RETAINER FOR SLIP SLEEVE LINERS

Thomas D. Woodward, Munster, Ind., and Gail G. Worsley, Hazelcrest, Ill., assignors to Rexnord Inc., Milwaukee, Wis.

Filed July 6, 1976, Ser. No. 702,825

Int. Cl.² F16D *3/06*

U.S. Cl. 64—23 **8 Claims**



1. In a telescoping drive shaft assembly comprising an outer member having an open end and an axial bore, an inner mem-

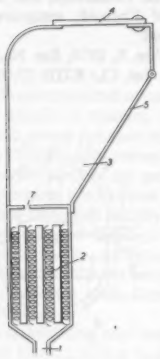
ber, and a liner fitting within the bore of said outer member and having an axial bore in which said inner member fits and is axially slidable, said liner including an outer body and a relatively low friction inner face such that only nominal axial securement of the liner in the outer member is required, retainer means providing such axial securement which includes (1) a keyway provided in the outer member adjacent to one of said unloaded sections of the liner, (2) a radially outward recess provided in the outer member at the open end of said keyway, and (3) a flexible key slidable endwise in said keyway and disposed alongside the liner, said key having inner and outer locking ends which project into the bore of the outer member at the opposite ends of the liner, the outer locking end having a radially outward projection which extends into said recess, the portion of the key adjacent to said outer locking end being of reduced section and spaced from the liner whereby the outer locking end of the key may be moved inwardly to withdraw the projection from the recess and allow the key together with the liner to be withdrawn axially from the outer member.

4,045,981

PROCESS FOR BULKING KNITTED FABRIC ARTICLES

Dennis Edward Clissett, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 510,140, Sept. 27, 1974, abandoned.
This application July 27, 1976, Ser. No. 709,261
Int. Cl.[2] D04B *15/92*; D06C *5/24*
U.S. Cl. 66—147 **8 Claims**



1. A process for developing yarn bulk in a knitted fabric article comprising yarn having potential bulk which is compatible with the time required to knit the article, said process comprising agitating and tumbling the fabric article in a chamber, directly after knitting in an automatic integrated process therewith and before said article is subjected to any wet treatment, by a turbulent stream of upwardly flowing heated air introduced into the chamber so as to support the fabric therein and removing the fabric in crease-free condition from the chamber after a period of time sufficient to develop the bulk.

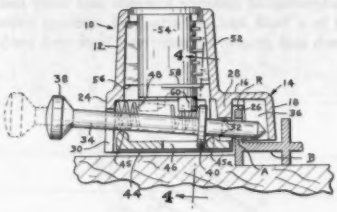
8. A process for developing yarn bulk in a knitted fabric article comprising yarn having potential bulk which is compatible with the time required to knit the article, said process comprising agitating and tumbling the fabric article in a chamber, directly after knitting in an automatic integrated process therewith and before said article is subjected to any wet treatment, by a turbulent stream of upwardly flowing heated air introduced into the chamber at a flow rate of 28–145 liters/minute and at a temperature of 112° C–160° C so as to support the fabric therein and removing the fabric in crease-free condition from the chamber after a treatment time of 0.5–2.0 minutes and sufficient to develop the bulk.

4,045,982

COMPACT PORTABLE LOCK FOR SLIDING WINDOWS AND DOORS

Howard Byron Gorton, San Gabriel, and Richard B. Lyons, Huntington Beach, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.

Filed Dec. 27, 1976, Ser. No. 754,186
Int. Cl.[2] E05C *65/08*
U.S. Cl. 70—90 **3 Claims**



1. A compact lock adapted to be attached to the rail of a sliding door or window to limit the movement thereof, the lock comprising a housing having an inverted rectangular box-shaped base with a top wall and sidewalls and a hollow cylindrical projection upstanding from the top wall and offset from the center of the top wall away from one of the sidewalls thereof, a circular opening in the top wall of the projection, the housing having aligned upwardly extending slots formed in opposite sidewalls adjacent the said sidewall and a pair of closely spaced fins extending inward from a central portion of the said sidewall on the underside of the base, the base having a downward flange parallel to the said sidewall and spaced inward from said slots, the flange and the sidewall opposite the said sidewall having aligned openings defining a passage transverse of the housing inclined downwardly toward the lower portion of the said sidewall and terminating in the space between the said pair of fins; a plunger disposed in the passage and extending outward of the base and terminating in an operating portion, the plunger having an outward annular flange disposed on the plunger intermediate said flange and the sidewall opposite the said sidewall, the circular opening in the top wall of the projection receiving a key-operated cylinder extending downwardly in the projection and having an operating stop at the lower end thereof offset from the axis of said cylinder, the cylinder being adapted when turned with a key to move from a locking position in which the stop blocks the annular flange and therefore the plunger from movement away from the spaced fins and therefore holds the plunger in locked position, and a second or unlocked position in which the stop does not interfere with the movement of the plunger, and a cover plate secured to the base on the underside thereof, the cover plate having a rectangular window adapted to receive the annular flange, the margins of the window defining at least one limit of travel of the annular flange and therefore the plunger; whereby with the plunger retracted, the aligned slots of the lock may receive the rail of a door or window and the plunger may be released to pass through a predrilled opening in the rail to the extended position, and the lock may be turned to the locked position to secure the lock in such attachment.

4,045,983

UNIVERSAL BARREL KEY APPARATUS

Donald R. Hughes, 2600 Brower Ave., Simi Valley, Calif. 93065

Filed July 29, 1976, Ser. No. 709,583
Int. Cl.[2] E05B *19/02*
U.S. Cl. 70—404 **8 Claims**

1. A barrel key apparatus comprising:

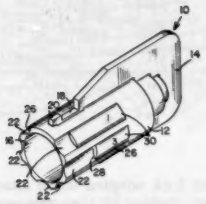
a handle section;

a tubular section with an inner end attached to said handle section and terminating in an outer end, said tubular section being partially hollow with an access opening within

the outer end thereof connecting with said hollow, said tubular section having a longitudinal center axis;

a projection extending inwardly through one wall thickness of the outer hollow surface of said tubular section adapted for cooperation with a mating groove in a lock to establish the proper inserting position within the lock;

said tubular section having a plurality of elongated grooves located upon the outer surface of said tubular section, each said groove beginning at said outer end and extending a predetermined distance towards said inner end terminating in a back end, an attaching opening provided within each said groove adjacent said back end, each said



attaching opening being radially disposed in respect to said longitudinal center axis;

a plurality of elongated push pins of various lengths, each said push pin having mounted on one end thereof an attaching member, each said push pin having a body section having an upper surface and a lower surface, said lower surface to matingly cooperate within a said groove, said upper surface to be flush with the said outer surface of said tubular section, each said attaching member having securing means thereon, a said attaching member to be located entirely within an attaching opening and to be secured to said tubular section by said securing means.

4,045,984

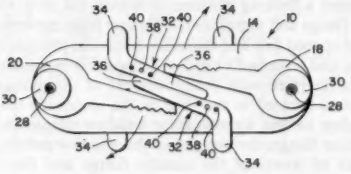
KEY HOLDER

Wallace McDonald, Apt. E2, 1701 W. Larpenteur, St. Paul, Minn. 55113

Filed Mar. 10, 1976, Ser. No. 665,781

Int. Cl.[2] A47G *29/10*

U.S. Cl. 70—456 R **4 Claims**



1. A key holder comprising

a first rigid plate,

a second rigid plate,

key retaining means extending between said first and second plates for pivotally mounting a key for movement from a stored position wholly between said plates to a use position wherein a portion of said key extends outwardly beyond the perimeter of said plates, and

an L-shaped lever pivotally mounted between said plates whose longer leg is a portion contacting and rotating a key mounted on said key retaining means from it stored to its use position, said longer leg including a series of holes for selectively receiving a pivot pin mounting said lever between said plates, and whose shorter leg normally extends beyond the perimeter of said plates for finger contact to pivot said lever.

4,045,985

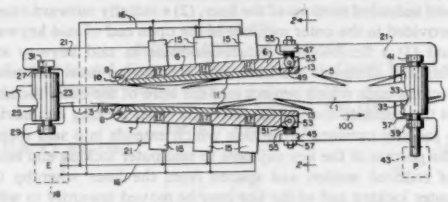
APPARATUS FOR MAKING BARBED MATERIAL

Daniel Dennis Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Filed Feb. 22, 1977, Ser. No. 770,357

Int. Cl.[2] B21F *25/00*; B21D *26/14*

U.S. Cl. 72—56 **10 Claims**



1. Apparatus for making barbed material comprising: a base; mechanism on said base adapted for moving a piece of magnetic material in a predetermined direction substantially along a predetermined center line; and means on said base for exerting a tractive magnetic force on an edge of said piece in a direction substantially perpendicular to said centerline whereby a deformable portion of said edge can be bent out from said piece.

4,045,986

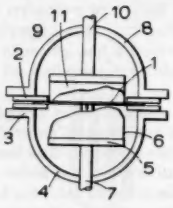
FORMING DUCTILE MATERIALS

David Brian Laycock, Cambridge, and Anthony John Barnes, Malvern, both of England, assignors to T.I. Superform, Worcester, England

Filed Apr. 5, 1976, Ser. No. 673,859

Int. Cl.[2] B21D *22/10*

U.S. Cl. 72—60 **13 Claims**



1. A method of forming a shaped body from a sheet of ductile metal, said method comprising clamping the periphery of sheet in a given plane, applying a differential pressure across said sheet to force said sheet into at least partial contact with a molding surface lying on that side of said sheet which is then at the lower pressure, said sheet being thereby partially shaped, advancing a male mold towards the opposite side of said sheet to project at least partially through said clamping plane, and applying reversed pressure conditions to cause said sheet to come into engagement with said mold and eventually take up the contours of said mold.

4,045,987

GEAR ROLLING EQUIPMENT

Leonard A. Gabriele, Warren, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Mar. 2, 1976, Ser. No. 663,062

Int. Cl.[2] B21H *5/04*

U.S. Cl. 72—84 **5 Claims**

1. A machine for finish-rolling bevel pinions having a shank extending axially from one side thereof, comprising

a frame including a column portion and a base portion,

a knee,

means mounting said knee for vertical movement in said base laterally of said column,

a horizontal work spindle in said column having an outer end portion overlying said knee,

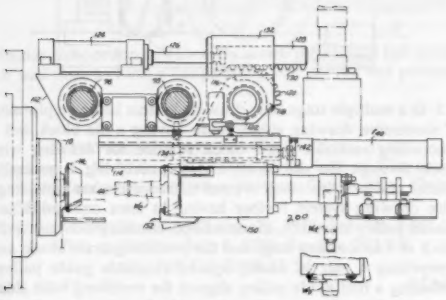
a collet at the outer end of said work spindle operable to grip the shank of a work gear and to hold it against rotation relative to said work spindle,

means mounting said work spindle for rotation,

a brake associated with said work spindle and operable to hold said work spindle against rotation in any random position,

a vertical tool spindle in said knee for carrying a tool in the form of a bevel gear substantially conjugate to the work gear and for preventing relative rotation between said tool spindle and the gear-like tool thereon,

locating means acting between said knee and tool spindle effective to stop said tool spindle in a precisely located angular position,



a motor carried by said and connected to one of said spindles for driving said one spindle in rotation,

pressure applying means acting between said base and said knee for raising said knee to apply pressure of metal forming intensity between the teeth of the gear and tool,

positioning means comprising a horizontal trackway along which work gears are advanced serially with the shank extending downwardly, fingers disposed along the trackway in position to enter into spaces between the teeth of the gears for positioning work gears serially at a preliminary loading station with the teeth thereof in precisely located angular position,

and transfer means for transferring said work gears serially from said preliminary loading station to move the shanks thereof into said collet without disturbing the angular position thereof.

4,045,988

ROTARY FORMING MACHINE AND TOOL

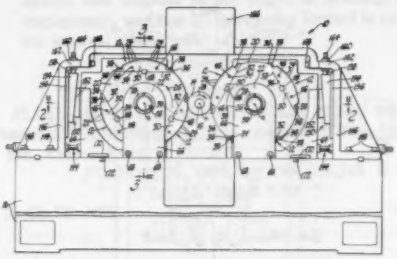
Marvin R. Anderson, Grosse Pointe Shores, Mich., assignor to Anderson-Cook Inc., Fraser, Mich.

Continuation-in-part of Ser. No. 676,827, April 14, 1976, abandoned. This application Aug. 4, 1976, Ser. No. 711,673

Int. Cl.[2] B21H *5/02*

U.S. Cl. 72—108 **30 Claims**

1. A rotary forming machine comprising: a work spindle for rotatably mounting a workpiece about a first axis; a pair of tool spindles rotatably mounted about spaced second axes on opposite sides of the first axis about which the workpiece rotates; a plurality of rotary tools associated with each tool spindle; each tool including leading and trailing ends and having a flat base mounting surface engaged with the associated tool spindle as well as including an oppositely facing partially circular forming face generated about the second axis of the associated tool spindle and having forming tooth groups located thereabout for an angle less than 180°; the teeth within each group having the same size and having a progressively increasing size from one group to the next group; the teeth within each group having a profile that is conjugate to the shape to be formed in the workpiece; mounting means for securing the tools to their associated tool spindles while permitting any tool on either tool spindle to be removed and replaced without replacement



of the other tools; and drive means for rotating the tool spindles so that the forming faces of associated pairs of the tools simultaneously engage and form the workpiece during a partial revolution of the tool spindles for less than 180°

4,045,989

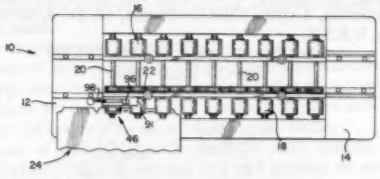
SHEET METAL BENDING APPARATUS

Marshall John Ryan, Palatine, Ill., assignor to The Lockformer Company, Lisle, Ill.

Filed Dec. 3, 1976, Ser. No. 747,252

Int. Cl.[2] B21B *39/02;* **B21D** *5/08;* **B21B** *1/24*

U.S. Cl. 72—133 **12 Claims**



1.In an apparatus for bending a metal sheet wherein a plurality of forming rolls progressively bend a sheet portion, the improvement in a first bending station of the apparatus comprising a first roll, means for mounting said first roll for rotation about its axis, forming protrusions positioned in spaced apart relationship on the surface of said first roll, roll drive elements engageable by said sheet and carried by said first roll, movement of said sheet against a drive element operating to move a forming protrusion into contact with the sheet for bending the sheet, and including means for angularly shifting the position of said first roll relative to said mounting means to thereby determine the drive element engaged by the sheet and to thereby determine the protrusion contacting the sheet.

4,045,990

ENDLESS REINFORCEMENT

Norman E. Klein, Inman, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

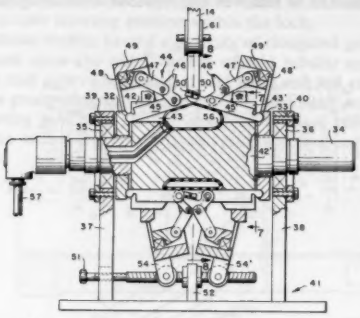
Division of Ser. No. 432,162, Jan. 10, 1974, Pat. No. 4,002,789. This application July 9, 1976, Ser. No. 704,069

Int. Cl.[2] B21D *13/00*

U.S. Cl. 72—190 **14 Claims**

1. Apparatus for forming a unitary strip including a multiplicity of continuous filaments disposed in a contiguous lateral undulating relationship throughout the length of strip, said apparatus including interdigitating gripper means arranged in an oval path, wherein each gripper means includes a clamping jaw member movable from an opened to a closed position,

means for advancing said gripper means around said oval path, and means for increasing the degree of interdigitation of said



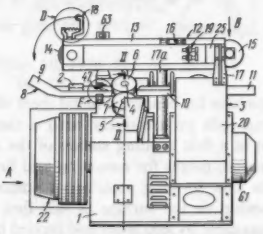
gripper means during a portion of their advancement around said oval path.

4,045,991

AUTOMATIC FORGE ROLLING MACHINE

Mikhail Vladimirovich Kholmogorov, ulitsa Trofimova, 20, kv. 50; Jury Vasilievich Katkov, 3 linia, 11, korpus 2, kv. 63; Grigory Vasilievich Vorbiev, Proletarsky prospekt, 23, korpus 1, kv. 131; Alexandr Mikhailovich Gusev, Chernomorsky bulvar, 15, korpus 2, kv. 124, and Eduard Gurgenovich Nazaretian, 1 ulitsa Mashinostroenia, 10, kv. 6, all of Moscow, U.S.S.R.

Filed Dec. 22, 1976, Ser. No. 753,289
Int. Cl.² B21B *39/06*
U.S. Cl. 72—251 **3 Claims**



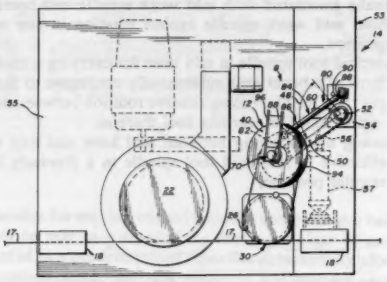
1. An automatic forge rolling machine comprising: a bed; stands mounted on said bed; two roll shafts mounted within each said stand and having each one free end; pairs of roll forging dies arranged one above the other on free ends of said roll shafts; a means for feeding a workpiece to said dies; said means being provided with a guideway for the workpiece to travel therealong; a conveyer kinematically associated with one of said roll shafts; a hauling member on the conveyer, said member carrying a pusher for advancing the workpiece along said guide way; means for braking the workpiece, said means being positioned ahead of a pair of said dies; a braking element of said means for braking the workpiece, said element being arranged substantially above said guide way and spring-biased towards the latter; a mechanism for tensioning the conveyer hauling member arranged behind said dies in the direction of the workpiece travel; said tensioning mechanism being made so that the tensioning of the hauling member is maintained constant in the direction of the workpiece travel, thereby providing accuracy of an initial position of the pusher ahead of said means for braking down the workpiece.

4,045,992

DANCER PULLEY MECHANISM

Evan Griffiths, Newington, Conn., assignor to Amtel, Inc., Providence, R.I.

Filed June 4, 1976, Ser. No. 690,011
Int. Cl.² B21C *1/10*
U.S. Cl. 72—279 **9 Claims**



1. In a multiple stage wire drawing system having a plurality of successive drawing stages, each having a die block and a succeeding rotatable draw block adapted for drawing wire stock through the die block and for receiving a generally helical coil of wire stock wound thereon, the multiple stage wire drawing system further having at least one guide and dancer pulley assembly, mounted operationally between a die block of a succeeding stage and the preceding draw block, and comprising a pair of axially spaced rotatable guide pulleys including a first guide pulley aligned for receiving wire stock from a coil on the preceding draw block and a second guide pulley aligned for feeding stock to the succeeding stage die block, a rotatable dancer pulley, and a dancer pulley control mechanism for shifting the dancer pulley back and forth, with its axis of rotation inclined to the axis of at least one of the guide pulleys for feeding wire stock from the frist guide pulley to and partly around the inclined dancer pulley and then to and partly around the second pulley to the succeeding stage die block, for controlling the tension of the wire stock, the improvement wherein the dancer pulley control mechanism comprises a dancer pulley pivot arm pivotal back and forth for shifting the dancer pulley back and forth relative to the guide pulleys, a rotary support rotatably mounted on the pivot arm about a first axis generally parallel to and spaced from the pivot axis of the pivot arm and rotatably supporting the dancer pulley for rotation about a second axis inclined to said first axis, and angle control means connected to the rotary support and responsive to pivotal movement of the dancer pulley pivot arm for automatically rotating the rotary support relative to the pivot arm, in conjunction with the pivotal movement of the pivot arm, for automatically controlling the relationship of the axis of rotation of the dancer pulley to the guide pulleys.

4,045,993

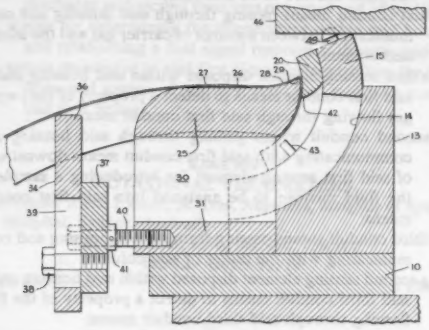
FENDER FLANGING APPARATUS

Herbert J. McCauley, Buffalo, N.Y., assignor to McCauley Metal Products, Inc., Buffalo, N.Y.

Filed Dec. 2, 1976, Ser. No. 746,862
Int. Cl.² B21D *7/06*
U.S. Cl. 72—387 **7 Claims**

1. Apparatus for forming a flange along the end of a bicycle fender or similar workpiece of curving transverse cross section and having a curved end portion whereby the fender end is of generally arcuate shape as viewed in side elevation, said apparatus comprising a supporting shoe fitting within the fender and having an end portion complementary to the interior of the fender, said end of said shoe being arcuate in side elevation, and a forming member having an internally arcuate surface concentric with the arcuate end of said shoe, means mounting said forming member for pivotal movement on an axis coinci-

dent with the common axis of said arcuate surfaces, whereby pivotal movement of said forming member bends the curved



fender end portion downwardly across the arcuate end portion of said shoe to form a flange along said curved end portion.

4,045,994

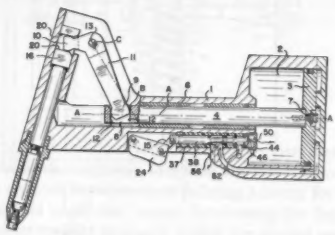
COMPRESSED AIR RIVET SETTING TOOL

Anthony E. Di Maio, and Willem Swier, both of Georgetown, Mass., assignors to Marson Fastener Corporation, Chelsea, Mass.

Division of Ser. No. 551,592, Feb. 21, 1975, Pat. No. 3,981,177. This application July 6, 1976, Ser. No. 702,876

Int. Cl.[2] B21J *15/34*

U.S. Cl. 72—391 **4 Claims**



1. A compressed air-powered blind rivet setting tool comprising

a. a housing;

b. a piston within the housing for movement by compressed air;

c. a piston rod connected to the piston and supported for reciprocating movement along a straight line within the housing;

d. rivet pulling means reciprocally mounted in said housing and spaced from the piston rod;

e. a pivotable lever member pivoted about a pivot axle on the housing, said lever member having a first cam surface at one end portion which surface is slidably engageable on the pulling means and having a second cam surface at the other end portion slidably engageable with the piston rod so that as the piston rod is moved a distance by the compressed air the rivet pulling means is moved a fraction of that distance, said lever member cam surfaces being shaped so that as the member pivots about the axle the distances between the axle and the lines of contact between the cam surfaces on the one hand and the pulling means and piston rod on the other hand remain constant; and

f. compressed air control means including valve means which direct compressed air to cause movement of the piston in one direction for actuating the rivet pulling means and cause movement of the piston in the other direction to return the piston, said compressed air control means includes a sleeve having an internal wall, a valve member slidable a selected distance within the sleeve between two limits each limit being defined by the engagement of a seal ring carried by the valve member against seat surfaces of the sleeve in abutting air tight engagement, said seat surfaces being formed in recesses in the internal sleeve wall.

4,045,995

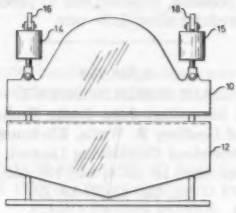
FLUID-MECHANICAL DRIVE FOR PRESS BRAKE

Charles H. Sparks, Eugene, Oreg., assignor to Steel Structures, Inc., Eugene, Oreg.

Filed Oct. 29, 1975, Ser. No. 626,849

Int. Cl.[2] B21D *7/06*

U.S. Cl. 72—450 **8 Claims**



1. In a press brake having a fixed lower blade and die and a cooperative vertically movable upper blade and die, upright end frames for supporting said blades, and drive means for said upper blade,

the improvement comprising:

a pair of lever members, one pivoted intermediate its opposite ends to each said end frame member above said upper blade for movement about a horizontal pivot axis normal to the length dimension of said upper blade,

a pair of extensible and retractable fluid cylinder means pivotally interconnecting one end portion of each said lever member and said upper blade at a first set of two spaced positions along said upper blade,

and mechanical means operably interconnecting the opposite end portion of each said lever member and said upper blade at a second set of two spaced positions along said upper blade which are spaced along said upper blade from said first two positions such that upon extension of said pair of cylinder means a downward driving force is applied to said upper blade and upon retraction of said pair of cylinder means an upward force is applied to said upper blade at four spaced-apart positions along the length of said upper blade,

said four positions being substantially equally spaced apart along the length of said upper blade so as to equalize the downward forces applied to said upper blade upon extension of said pair of extensible cylinder means, and said upper blade having a substantially uniform vertical dimension of minimum height throughout its length whereby said four positions adequately support said blade from bending in use.

4,045,996

TEST FIXTURE FOR LEAK DETECTORS

James E. Sopcak, Chicago, and Walter Rowland, Darien, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Filed Sept. 15, 1976, Ser. No. 723,358

Int. Cl.[2] G01M *3/26*

U.S. Cl. 73—1 R **8 Claims**

1. An improved test fixture for verifying the proper operation of leak detectors in a can-making line, comprising a can

having a body, a closure on one end of said body, an orifice of a predetermined size formed in said can, and a filtering medium of predetermined porosity affixed to said can covering said

orifice, and means for introducing a test fluid, maintained at a predetermined pressure, into said can to produce a simulated leak having a predetermined flow rate.

4,045,997

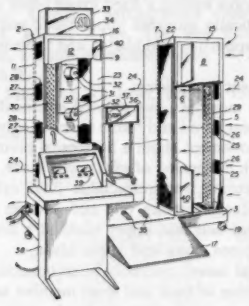
AIR CURTAIN DEVICE

Lane Crawford Showalter; John Leslie Brokenshire, both of Waterloo, and Geoffrey B. Watts, Kitchener, all of Canada, assignors to Marsland Engineering Limited, Canada

Filed Mar. 11, 1976, Ser. No. 665,997

Int. Cl.[2] G01N *33/22*

U.S. Cl. 73—23 **9 Claims**



1. An air curtain device for use in detecting selected vapours emitted from objects positioned therein, said device comprising first and second spaced apart cabinets, a vertical wall of said first cabinet provided with an air discharge grill, a vertical wall of said second cabinet provided with a corresponding and complementary air intake grill, said air discharge grill being directly opposite to said air intake grill, air intake means on said first cabinet upstream of said air discharge grill, air exhaust means in said second cabinet downstream of said air intake grill, said air intake and air discharge means being synchronized to provide a substantially uniform horizontal flow of air from the first cabinet to the second cabinet, and vapour detection means located intermediate said air intake grill and said air exhaust means.

4,045,998

TEMPERATURE CONTROL SYSTEM

Gregory A. Ford, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 1, 1976, Ser. No. 662,778

Int. Cl.[2] G01N *31/08*

U.S. Cl. 73—23.1 **5 Claims**

1. A chromatographic analyzer comprising:

an insulated housing;

a chromatographic column positioned within said housing, said column being filled with a packing material that selectively retards passage therethrough of constituents of the fluid mixture to be analyzed;

first conduit means passing through said housing and communicating between a source of carrier gas and the inlet of said column;

a first sensing element disposed within said housing and in said first conduit means to detect a property of the carrier gas flowing through said first conduit means;

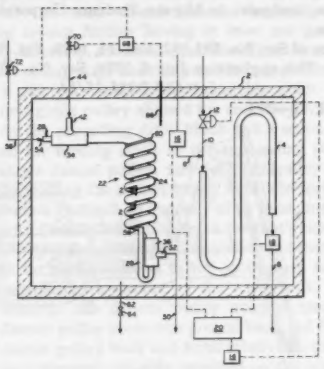
second conduit means passing through said housing and communicating with said first conduit means downstream of said first sensing element for introducing a sample of the fluid mixture to be analyzed into said first conduit means;

third conduit means passing through said housing and communicating with the outlet of said column;

a second sensing element disposed within said housing and in said third conduit means to detect a property of the fluid flowing through said third conduit means;

means for comparing the outputs of said first and second sensing elements;

means disposed within said housing for maintaining the temperature of said housing at a substantially constant value comprising in combination, a helix having a plurality of spaced turns, said helix consisting essentially of an outer tubular member and an inner tubular member dis-



posed within said outer tubular member, said inner tubular member having an outside diameter smaller than the inside diameter of said outer tubular member whereby the space between said inner and outer members provides a first passage for a first fluid medium and said inner tubular member provides a second passage for a second fluid medium; said outer tubular member having a first end and a second end, said inner tubular member having a first end, a first end portion, a second end and a second end portion; a first fitting disposed about and having one end sealed with respect to said first end portion of said inner tubular member and having the opposite end thereof operably connected to said first end of said outer tubular member and an inlet port in the wall of said first fitting; fourth conduit means passing through said housing and communicating between a source of supply of said first fluid medium and said inlet port of said first fitting; fifth conduit means passing through said housing and communicating between a source of supply of said second fluid medium and said first end of said inner tubular member; a second fitting disposed about and having one end sealed with respect to said second end portion of said inner tubular member and having the opposite end thereof operably connected to said second end of said outer tubular member and an outlet port in the wall of said second fitting; sixth condit means passing through said housing and com-

municating with said outlet of said second fitting; wherein said second end of said inner tubular member is adapted to discharge said second fluid into one open end of said helix;

means for determining the temperature within said housing and establishing a first signal responsive thereto; and

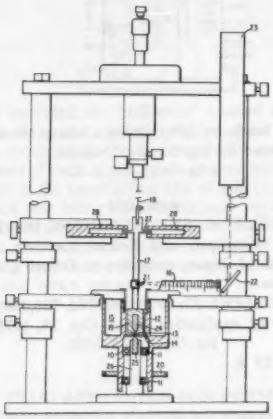
means responsive to said first signal for controlling the flow from said source of said first fluid into said inlet port of said first fitting.

4,045,999

ROTATIONAL VISCOMETERS

Alexander Allan Palmer, St. Ives, Australia, assignor to Sydney Hospital, Sydney, Australia

Filed Nov. 5, 1976, Ser. No. 739,267
Int. Cl.² G01N *11/14*
U.S. Cl. 73—59 **3 Claims**



1. A rotational viscometer consisting of a first member and a second member, relatively rotatable about a common vertical axis, the member between them defining a cavity for the reception of a fluid under test, means for rotating the first member, a permanent magnet arranged within the second member and on the said axis, a second permanent magnet arranged on the said axis adjacent the first magnet, the arrangement being such that the magnets interact to maintain the members coaxial during rotation of the first member, said first member being a hollow vertically extending cylinder open at its upper end defining within it a cavity for the reception of a fluid to be tested, said cavity having a floor of electrically non-conductive material, and said second member being a cylinder arranged within the said cavity, the permanent magnet arranged within said second member tapering to a point on the said axis at its lower end, the second magnet being supported immediately below the floor of the said cavity, the upper end thereof being tapered to a point lying on said axis.

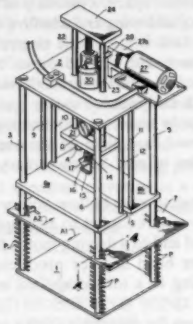
4,046,000

APPARATUS AND METHOD FOR TESTING ARTICLE CARRIERS

Richard Kenneth Watkins, Lithonia, and William S. Layman, Marietta, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Feb. 25, 1977, Ser. No. 772,068
Int. Cl.² G01N *3/08*
U.S. Cl. 73—95 **13 Claims**

10. A method of testing the mechanical strength of a basket style article carrier having bottom, side and end walls and a handle secured to the carrier end walls, the method comprising loading the carrier with articles, restraining the articles in such manner as to prevent movement thereof in a direction away from the carrier bottom wall, imparting a gradually increasing



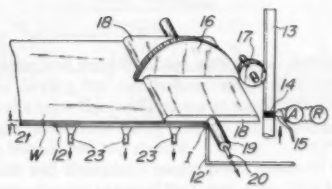
force to the carrier handle in a direction away from the carrier bottom wall until the carrier fails mechanically.

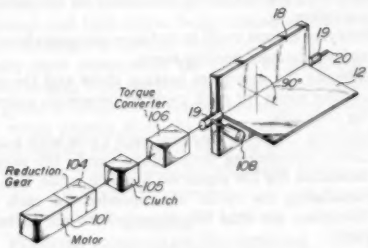
4,046,001

APPARATUS FOR MEASURING RESTORING FORCE NECESSARY FOR RAISING FOLDED PORTIONS OF HARD PAPER BOXES

Fumiaki Maeda; Seiji Naruse, both of Chiba, and Ko Kamiya, Ichikawa, all of Japan, assignors to Lion Fat & Oil Co. Limited and Toyo Sieki Seisakusho Ltd., both of Tokyo, Japan

Filed June 27, 1975, Ser. No. 590,915
Claims priority, application Japan, July 2, 1974, 49-78501[U]
Int. Cl.² G01N *3/22*; G01L *5/12*; B31B *5/74*
U.S. Cl. 73—100 **9 Claims**





1. An apparatus for measuring a restoring force necessary for raising folded portions of a hard paper box, comprising

a framework;

a base plate for disposing thereon a hard paper box having ruled folded line edges formed between small and large portions and slidably supported by said framework and including a plurality of suction nozzles each extending through said base plate and opened at the top surface thereof;

means for adjusting the position of said base plate;

a hollow rotary wing including a base surface for sandwiching a folded box between said base surface and the base plate, an interior space, a plurality of suction holes formed in the base of said wing and a hollow center shaft rotatably supporting said wing at that center of said wing which makes contact with a hard paper box to be tested and having a suction tube extended therethrough and communicated with said interior space;

a vacuum supply source communicated with said suction nozzles of said base plate on the one hand and with said suction holes of said hollow rotary wing on the other hand;

means for rotating said hollow rotary wing; comprising a torque converter coupled to said hollow rotary wing on the one hand and to a driving motor for rotating said wing on the other hand and for producing an electric signal corresponding to a torque applied to said hollow rotary wing; and

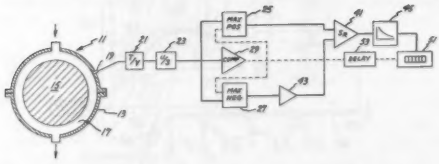
a detector means for detecting a force necessary for rotating said hollow rotary wing, including means for receiving said electric signal from said torque converter, and therefrom detecting a difference between a force for rotating said hollow rotary wing under no load condition and a force for rotating said hollow rotary wing under a loaded condition.

4,046,002

METHOD AND APPARATUS FOR DETERMINING ROTOR LIFE EXPENDED

Bartholomew D. Murphy, Marblehead, Mass., and David C. Gonyea, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 2, 1976, Ser. No. 738,321
Int. Cl.² G01N 3/00
U.S. Cl. 73—116 **16 Claims**



1. A method for determining the life expended for a turbomachine part based upon cyclic duties imposed on the turbomachine part comprising the steps of:

determining a stress versus time curve for the turbomachine operation;

identifying a stress cycle including a maximum heating stress and a maximum cooling stress;

combining the maximum heating stress and the maximum cooling stress for each cycle to determine a stress range for the cycle;

comparing the stress range for each cycle with a calculated curve representing stress range versus life expended to determine the life expended for each cycle; and,

accumulating the cyclic life expended for each cycle to determine the total life expended for the turbomachine part.

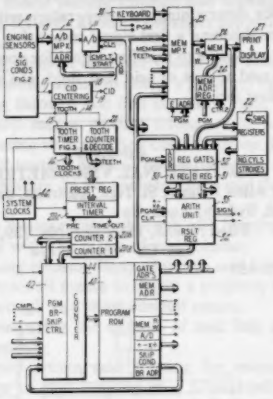
4,046,003

ENGINE TURBOCHARGER DIAGNOSTICS

Lee R. Armstrong, and Henry J. Mercik, Jr., both of Enfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 7, 1976, Ser. No. 684,216
Int. Cl.² G01M 15/00
U.S. Cl. 73—118 **11 Claims**

1. A method of diagnosing the health of a turbocharger on an internal combustion engine during a snap acceleration of the engine while the engine is loaded only by its own inertia, drag, and accessory loads, by determining a rate of increase in intake manifold pressure during the acceleration.

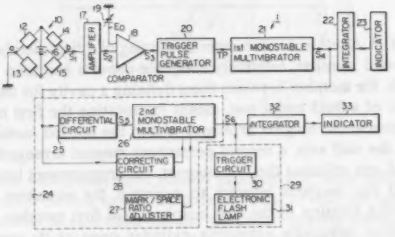


4,046,004

DIESEL ENGINE DIAGNOSING DEVICE

Yuji Iwasaki, Kawagoe, and Koichi Kashima, Higashimatsuyama, both of Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1976, Ser. No. 736,349
Claims priority, application Japan, Oct. 29, 1975, 50-129345
Int. Cl.² G01F 9/00
U.S. Cl. 73—119 A **5 Claims**



1. A Diesel engine diagnosing device, comprising:

a transducer to convert the time-change of an injection pressure occurring in the fuel injection system of a Diesel engine into an electrical signal;

a first pulse generator to produce first pulses which are generated so as to have a predetermined duration when the primary components of the output electrical signal from said transducer build up;

a second pulse generator to produce second pulses which are generated when triggered by the leading edges of said first pulses and which can be set for a desired mark-space ratio;

an electronic flash emitter which flashes when triggered by the trailing edges of said second pulses;

a first marking provided on the stationary part of said Diesel engine;

a second marking provided on the rotary part of said engine so that said second marking is in an angular position which coincides with the angular position of said first marking when the crankshaft of the Diesel engine is in a predetermined angular position, and;

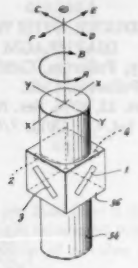
an injection timing indicator which displays the integral value of the output signal from said second pulse generator.

4,046,005

THREE AXIS JOYSTICK CONTROL

Robert D. Goroski, Trumbull, Conn., assignor to Measurement Systems, Incorporated, Norwalk, Conn.

Filed June 14, 1976, Ser. No. 695,738
Int. Cl.[2] G01L 5/22
U.S. Cl. 73—133 R 8 Claims



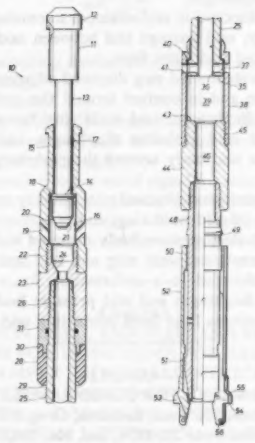
1. A force operated, or "stiff-stick" control device which comprises: an elongated control rod; two pairs of elongated strain gauges mounted on the surface of said control rod, the longitudinal axis of each of said strain gauges being disposed at an acute angle to the longitudinal axis of said control rod, the gauges of each pair being on diametrically opposite sides of said rod, the diameters passing through the pairs being perpendicular to one another, and the angles of slope of the gauges of each pair being in the same direction; and means for connecting each of said strain gauges to electric means to provide signals in response to both lateral and torsional flexing of said rod.

4,046,006

TUBING PLUG APPARATUS FOR PERFORMING DOWN-HOLE PRESSURE TESTS

Alex Dufrene, P.O. Drawer D, Des Allemands, La.

Filed July 9, 1975, Ser. No. 594,331
Int. Cl.[2] E21B 47/10
U.S. Cl. 73—151 9 Claims



1. A tubing pressure test apparatus comprising:

an elongate body having a fishing neck adapted to be grasped by a wire line tool and which fishing neck is relatively movable with respect to said elongate body and further including a cooperative valve element in a valve seat means movable between open and closed positions by operation of said fishing neck and which valve element controllably opens and closes the flow of well fluids through a passage through said elongate body;

an expandable element carried by said body and expanded radially outwardly toward a surrounding tubing string to close a tubing string to fluid flow therethrough;

expander means at least indirectly supported on said body for expanding said element radially outwardly toward a surrounding tubing string by compressing said element, said means being selectively operated by weight acting on the tubing pressure test apparatus; and

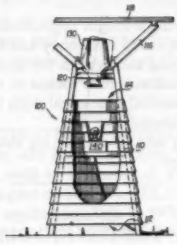
lock means adapted to secure the tubing pressure apparatus at a selected and specified elevation in a tubing string to enable weight acting on the tubing pressure test apparatus to operate said expander means.

4,046,007

COMBINED LIGHTHOUSE AND WIND DIRECTION INDICATOR

Joseph O. Tally, Jr., 560 N St. SW., Washington, D.C. 20024

Filed Nov. 17, 1976, Ser. No. 742,444
Int. Cl.[2] G01P 13/02
U.S. Cl. 73—188 6 Claims



1. A lighthouse and wind direction indicator comprising:

A. a tower having top and bottom, said tower defining adjacent the top a fixed ring mount to support an illuminable target; said tower being open to the atmosphere at both the bottom and top thereof;

B. a movable and illuminable target globe, mounted in the ring mount adjacent to top of the tower, said globe having a closed end at its top and an open, flared-lip end at its bottom, the globe coactively engaging the ring mount intermediate its top and bottom;

C. a light source within the tower, remote from the illuminable target, said light source being trained at least in part toward the target to illumine same;

whereby upon exposure of the globe to the prevailing winds passing from the bottom to the top of the tower, the globe is restrainedly floated vertically and whereby the winds passing from the sides, the globe will tilt within the ring mount and as such, the globe is rendered directionally responsive to the prevailing winds.

4,046,008

FLUIDIC TEMPERATURE SENSOR

Stanley Gordon Best, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,994
Int. Cl.[2] G01K 11/24, 11/26
U.S. Cl. 73—349 10 Claims

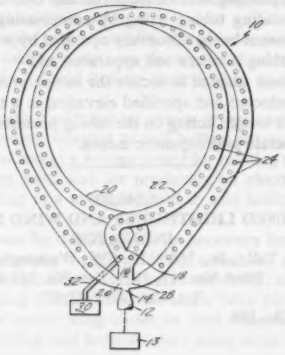
1. A fluidic oscillator temperature sensor assembly for determining the average temperature of a stream of flowing gas in a conduit comprising:

a source of pressurized gas;

fluid amplifier means connected to said source for introduc-

ing said pressurized gas into said fluid amplifier as a power stream;

feedback tube means adapted for support across a desired cross-sectional area of said conduit connected to said fluid amplifier means for oscillating the flow of said power stream at a frequency varying directly as a function of the temperature in said feedback tube means, said feedback



tube means having a length approximately one-half wavelength of the expected frequency and having a plurality of perforations along said length for admitting said flowing gas into said feedback tube means to render the temperature therein essentially identical with the average temperature of said flowing gas; and

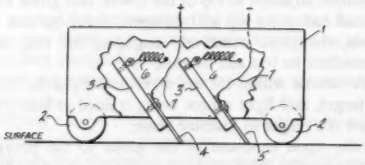
means for sensing said frequency for determining said average temperature.

4,046,009

THERMOCOUPLE FOR CONTINUOUSLY MEASURING THE TEMPERATURE ALONG THE LENGTH OF A SURFACE

Charles A. Sauer, Belleville, Ill., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Apr. 23, 1976, Ser. No. 679,770
Int. Cl.² G01K *7/08, 1/14*
U.S. Cl. 73—359 R **10 Claims**



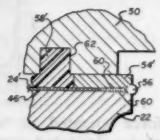
1. An apparatus for measuring the temperature along the length of a surface comprising, in combination, mounting means for mounting the temperature measuring components; several wheels being suitable for contacting the surface to be measured, said wheels being free to rotate about axles which are attached to one end surface of said mounting means; several strips of non-conductive material privotally and separately secured within said mounting means; said temperature measuring components including metal ribbons, which are dissimilar in the manner that at least one of said ribbons is electrically positive with respect to the surface and at least one of the other ribbons is electrically negative with respect to said surface, mounted with securing means adjacent one end of each strip of non-conductive material, provided that the metal ribbons are all placed in the same direction away from the pivot points; tension spring means connected adjacent the ends of the non-conductive strips opposite to the ends supporting said metal ribbons, the ends of said spring means not connected to said non-conductive strips being secured to said mounting means; said metal ribbons projecting below the plane of the bottom of said wheels when said spring means are in a relaxed position; and lead wires connected to the securing means for each metal ribbon, said wires running from said securing means to temperature indicating instruments.

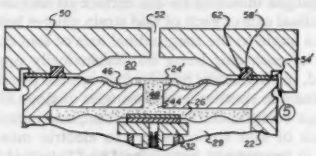
4,046,010

PRESSURE TRANSDUCER WITH WELDED TANTALUM DIAPHRAGM

Lloyd Thomas Akeley, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Nov. 12, 1976, Ser. No. 741,323
Int. Cl.² G01L *7/08*
U.S. Cl. 73—406 **3 Claims**





3. An improved pressure transducer for use with corrosive process fluids comprising:

a. a stainless steel body containing a chamber and having a passage from said cavity terminating at an outer face;

b. a position transducer disposed in said chamber;

c. a tantalum isolation diaphragm disposed adjacent said outer face and in contact around the periphery of said isolation diaphragm, said isolation diaphragm being continuously brazed to said outer face around the periphery of said diaphragm;

d. fill fluid disposed in said chamber to contact said position transducer, said passage and between said isolation diaphragm and said outer face;

e. a stainless steel weld ring disposed adjacent said isolation diaphragm and in contact around the periphery of said isolation diaphragm, said weld ring being continuously brazed to said isolation diaphragm and continuously welded to said body around the periphery of said weld ring;

f. an elastomeric seal disposed continuously around the inner periphery of said weld ring; and,

g. a stainless steel pressure body disposed and held continuously against said weld ring and said seal whereby said seal is subjected to a deformation force between said isolation diaphragm and said pressure body sufficient to seal the process fluid from contacting said weld ring.

4,046,011

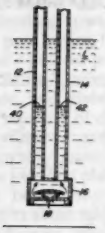
ONE-WAY VALVE FOR FLUID SAMPLER DEVICE

Donald W. Olsen, 850 Kees, Lebanon, Oreg. 97355

Filed June 29, 1976, Ser. No. 700,854
Int. Cl.² G01N *1/14*; F16K *15/04*
U.S. Cl. 73—421 B **11 Claims**

1. A fluid sampler device with one-way valve comprising; first means for sampling fluid, second means for controlling the frequency of sampling in a repetitive manner, and third means for effecting a one-way flow of the fluid being sampled, said first means including a sample chamber, and the third means

including a valve chamber for the fluid sample, an inlet thereto, and a sample outlet therefrom, and the third means further including a flexible valve member which normally takes on a concave shape when the valve is passing fluid, and assumes a



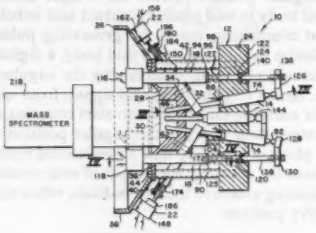
flat plane shape when the fluid flow is stopped and the valve is closed. and fourth means associated with the flexible valve to effect the cleaning action of a valve seat within the valve chamber.

4,046,012

FLUID SAMPLING DEVICE

David K. Studenick, Rockville, Md., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 19, 1976, Ser. No. 743,249
Int. Cl.[2] G01N *1/24*
U.S. Cl. 73—421.5 R 21 Claims



1. A fluid sampling device for selectively sampling multiple fluids comprising:
a support frame;
a plurality of fluid inlet means extending through said support frame, each of said inlet means having an aperture extending therethrough;
means responsive to a control signal for selectively opening said aperture for passing said fluid therethrough; and
means responsive to another control signal for selectively closing said aperture for terminating further fluid flow therethrough.

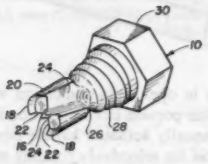
4,046,013

COMBINATION DRILL AND PLUG AND METHOD AND APPARATUS FOR USING SAME FOR EXTRACTING A FLUID SAMPLE FROM AN ELECTRICAL CABLE

Cyril Robert Green, Honesdale, Pa., assignor to Mario D. Medio and Grace E. Medio, both of Malverne, N.Y.

Filed June 1, 1976, Ser. No. 691,223
Int. Cl.[2] G01N *1/10*; F16F *51/00*
U.S. Cl. 73—422 R 26 Claims

1. A combination drill and plug comprising a drive means having a body with means thereon for removing a mass of material to make an opening,
said removing means being a cutting means comprising at least one arcuate segment defining an ear having a cutting portion at the leading edge thereof in the direction of rotation to form a disk of the removed material,
said ear engaging the disk of removed material to retain the same on said removing means,
thread forming means on said drive means coextensive with said removing means for engaging the wall of the opening formed by the removal of material,
plug means coextensive with said thread forming means including means to plug the opening,



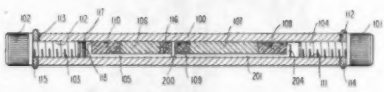
and means engageable with said drive means for rotating and axially advancing said removing means, said thread forming means and said plug means to remove the disk of material during the making of an opening, threading the opening and then plugging the opening to close the same while the disk of removed material is retained on said removing means and removable from engagement therewith after the opening is plugged closed.

4,046,014

SEALABLE ACTIVATED CHARCOAL GAS SAMPLER

John R. Boehringer, 427 Parkview Drive, and John Lecky, 501 Shortridge Ave., both of Wynnewood, Pa. 19096

Continuation-in-part of Ser. No. 588,772, June 20, 1975, abandoned. This application Feb. 9, 1976, Ser. No. 656,258
Int. Cl.[2] G01N *1/22*
U.S. Cl. 73—421.5 R 11 Claims



1. A cartridge for sampling ambient gases comprising:
a rigid metallic cylindrical thermally conductive tube, inert to the ambient gases and provided with a threaded portion at each end;
a predetermined charge of gas absorber material within said tube;
first and second rigid, integral, thermally conductive plugs having a rigid substantially permanent force fit in thermally conductive relation with the interior of said tube, said plugs having openings therethrough to permit flow of gases through said plugs and said tube, said plugs permanently enclosing and compressing said absorber material in said tube; and
sealing screw means for each end of said tube.

4,046,015

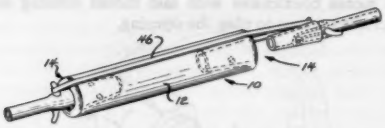
GLASS SAMPLING TUBE

Frederick J. Riedl, Arlington Heights, and George A. Schimmelpfennig, Des Plaines, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Oct. 12, 1976, Ser. No. 731,500
Int. Cl.[2] G01N *1/22*; F17C *3/00*
U.S. Cl. 73—421.5 R 8 Claims

1. In a glass gas sampling tube comprising a tubular body portion having an axially positioned inlet tube portion at each end and sealable joint means at each end for selectively sealing

said inlet tubes from the interior of said body portion, the improvement comprising said joint means being formed of axially extending tapered male inner and female outer glass wall portions which are positioned in cooperating relationship within the body portion and radially spaced from the walls of said body portion, said inner portion having a first opening in



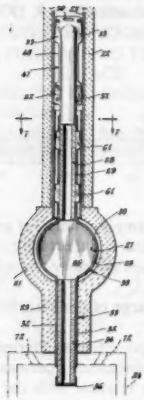
its wall portion in open communication with said inlet tube portion, said outer portion having a second opening in its wall portion, and manually actuated handle portions integral with said inner portion for selectively rotating said inner portion in said outer portion for moving said first opening into or out of communication with said second opening.

4,046,016

MOLTEN STEEL SAMPLERS

Robert J. Hackett, Cross Road, Brookfield Center, Conn. 06805

Continuation-in-part of Ser. No. 644,082, Dec. 24, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,561
Int. Cl.² G01N *1/12*
U.S. Cl. 73—425.4 R **15 Claims**



1. A hollow, heat-insulated sampler for deep immersion in molten metal comprising:

A. a hollow chill mold having an open entrance end for exposure to the molten metal,

B. a protective cap temporarily closing the open entrance end during deep immersion movement of the sampler into the molten metal,

C. a hollow, porous, heat-insulating ceramic housing enclosing the chill mold anchored to an elongated hollow heat-insulating support tube connecting the hollow interior of the housing to the atmosphere, and

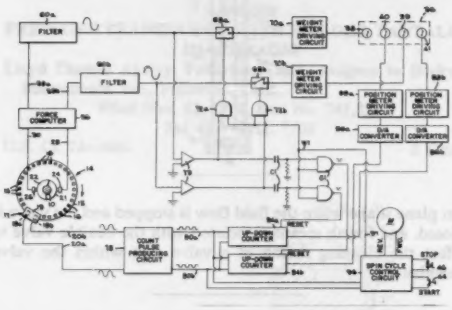
D. a slotted riser vent tube connecting the hollow interior of the chill mold to the interior of the support tube and having elongated vent slot means exposed to the support tube's interior, directing escaping air displaced from the hollow chill mold for venting to the atmosphere.

4,046,017

WHEEL BALANCING APPARATUS

Jerry M. Hill, North Little Rock, Ark., assignor to FMC Corporation, San Jose, Calif.

Filed Dec. 16, 1976, Ser. No. 751,237
Int. Cl.² G01M *1/22*
U.S. Cl. 73—462 **7 Claims**



1. In combination with an apparatus for measuring the imbalance of a rotary body in at least one plane normal to the axis of the rotary body including means for rotating the body about its axis, means for detecting forces generated by the imbalance in said plane and for generating signals representative of the magnitude and angular position of said imbalance in said plane, means responsive to said signals for displaying the magnitude of a weight to be added to said body in said plane to correct said imbalance, and means responsive to said signals for indicating the angular position where the weight should be attached to said body in said plane to correct said imbalance, the improvement comprising: means for generating pulses in synchronous relation to the rotation of said body, a digital counter responsive to said pulses for determining the angular position of said body, means responsive to said signals from said detecting means for enabling said counter to start counting at a point in time corresponding to when the angular position of imbalance in said plane of the body is at a preselected rotative position, and means for applying the output of said counter to said position indicating means to thereby indicate when said body is in said rotative position.

4,046,018

WHEEL BALANCING APPARATUS

Glennis W. Lasiter, Kershaw Trailer Court, Colona, Ill. 61241

Filed Sept. 9, 1976, Ser. No. 720,177
Int. Cl.² G01M *1/12*
U.S. Cl. 73—482 **5 Claims**

1. A wheel balancing apparatus comprising:

stand means having a base, a shaft, a support bar and a

plurality of balancing posts, said base being ground engageable, said shaft being detachably affixed to said base and extending upwardly therefrom, said shaft having affixed thereto at the upwardly extended end thereof said support bar, said balancing posts being parallel, affixed to said support bar, laterally spaced and aligned along said support bar and extending upwardly from said support bar, each balancing post having formed at the upwardly extended end thereof a pointed portion;

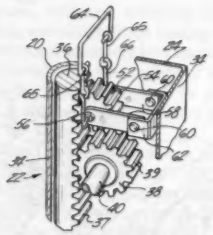
support means for holding a wheel, said support means including a flat plate, said plate having formed in the underside thereof a plurality of depressions, said depressions being laterally spaced and aligned, said pointed portions being removably received within said depressions and defining an axis, said plate being pivotable about said axis, a wheel being receivable upon said plate whereby the wheel tilts about said axis when the wheel is unbalanced; and indicating means for adjusting sensitivity having an indicator shaft and a weight, said indicator shaft being attached to said plate and depending therefrom, said weight being elongated, having a first end thereof affixed to said indicator shaft and a second end thereof extended away from said indicator shaft, said weight being slidable along the length of, and rotatable about, said indicator shaft.

4,046,019

LOCKING DEVICE FOR A LIFT

Arthur V. Phillips, 1289 Easley Drive, Westland, Mich. 48185

Filed June 16, 1975, Ser. No. 587,269
Int. Cl.² F16H *19/04*
U.S. Cl. 74—29 **5 Claims**



1. A locking device for a lift, said lift having a base and a platform wherein said lift may be variably elevated relative to said base, said locking device comprising,

an elongated gear rack secured to said platform and axially and slidably received in a housing, said housing secured to said base;

a first rotatable gear having its axle secured with respect to said base and being positioned to mesh with said gear rack;

a second gear disposed in said housing and adapted to mesh with said rack, means for mounting said second gear axially along said gear rack between a first and second position so that in said first position said second gear is spaced apart from said first gear whereas in said second position, said second gear meshes with both the gear rack and the first gear thereby locking said gear rack against further longitudinal movement.

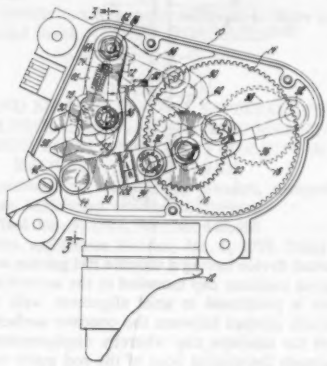
4,046,020

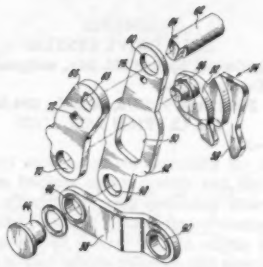
WINDSHIELD WIPER DRIVE MECHANISM HAVING A DEPRESSED PARK POSITION

John A. Budinski, and Raymond A. Flora, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 28, 1976, Ser. No. 652,909
Int. Cl.² F16H *21/40*
U.S. Cl. 74—70 **2 Claims**

1. A windshield wiper drive mechanism having a normal arcuate wipe pattern and a park position disposed outside the normal arcuate wipe pattern comprising: rotary input means; an output crank arm having one end pivotally mounted on an axis and having an output shaft aligned with said axis; a drive link having one end pivotally connected to said rotary input means; a control link having one end pivotally mounted on said output shaft and being rotatable about the axis of said output shaft relative to said output shaft, the other end pivotally connected to the other end of said drive link, and a cam slot formed therein intermediate the ends; a cam disposed in said cam slot having a pin portion drivingly connected to the other end of said output crank arm and an actuator portion said cam, pin portion and crank arm cooperating to maintain the position





of the control link relative to the position of the output shaft and output crank arm and forming a drive connection between said control link and said output shaft so that said output crank arm, said control link and said output shaft are driven through said normal wipe pattern; and actuator means selectively operable to engage said actuator portion for enforcing movement of said cam in said cam slot so that said control link is rotated about said axis for movement relative to both said output crank arm and said output shaft and said output crank arm and output shaft are pivoted on said axis through an arc outside said normal wipe pattern to the park position upon the completion of wiping while the arc of travel of the control link remains unchanged.

4,046,021

FREE FLOATING ACTUATING LINKAGE

Kenneth E. McKee, Chicago, and Alex J. McAllister, Tinley Park, both of Ill., assignors to International Harvester Company, Chicago, Ill.

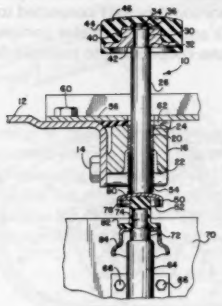
Filed Aug. 19, 1976, Ser. No. 715,966
Int. Cl.² G05G *1/14*; F16H *21/44*
U.S. Cl. 74—110 **7 Claims**

1. A motion transmitting device for communicating motion

from a first body to a second body independent of the first body and minimizing the transmission of vibrations from the second body to the first body comprising:

a rod guide having a central bore therethrough affixed to the first body;

a rod slidably carried in the rod guide central bore having a first end equipped with a pedal and a second end equipped with a cup having a concave surface;



a control device having a variable rod portion accommodating an insulator cap mounted to the second body thereof that is positioned in axial alignment with the rod and affords contact between the concave surface of the cup and the insulator cap whereby displacement of the rod through the central bore of the rod guide results in displacement of the movable rod portion of the control device.

4,046,022

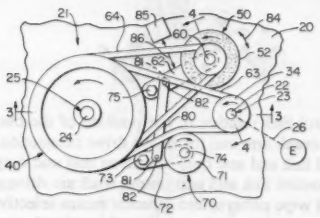
BELT DRIVE SYSTEM

Dewey D. Henderson, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed June 9, 1976, Ser. No. 694,409

Int. Cl.[2] F16H *9/00, 11/00*

U.S. Cl. 74—220 **28 Claims**



1. In an apparatus having a driving shaft which is rotatable at a first position in one direction only and a driven shaft which is rotatable at a second position remote from said first position, the improvement comprising a belt drive system for selectively rotating said driven shaft in said one direction and in an opposite direction, said belt drive system comprising, a driving sheave assembly fastened to said driving shaft, said driving sheave assembly having means defining a first belt-receiving groove and having a right circular cylindrical driving surface, a driven sheave assembly fastened to said driven shaft and having means defining a first and a second belt-receiving groove, a movable sheave assembly which is movable toward and away from said driving sheave assembly, said movable sheave assembly having means therein defining a second belt-receiving groove and having a right circular cylindrical driven surface, a first belt disposed in said first grooves for rotating said driven sheave assembly in said one direction with said movable sheave assembly disposed in spaced relation from said driving sheave assembly, a second belt disposed in said second grooves, and means serving the dual prupose of moving said movable sheave assembly with its driven surface into engagement with said driving surface and creating slack in said first belt rendering it inoperative so that said driving sheave assembly provides rotation of said driven sheave assembly in said opposite direction through the action of said second belt.

4,046,023

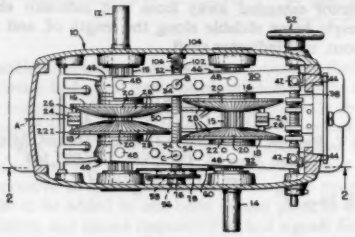
ADJUSTING MECHANISM FOR TRANSMISSION BAND TENSIONER

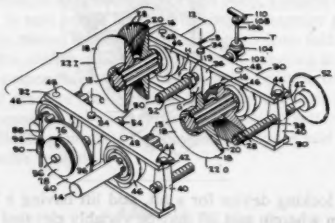
Richard G. Henle, Lafayette Hill; Clifton S. Merkert, Springfield, and David C. Thomas, Jenkintown, all of Pa., assignors to FMC Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 674,002, April 5, 1976. This application Oct. 1, 1976, Ser. No. 728,577

Int. Cl.[2] F16H *7/08, 55/52*

U.S. Cl. 74—242.8 **6 Claims**





1. In a transmission band tensioning mechanism having a band tensioning shaft and having an adjusting wheel mounted coaxially with said shaft and rotatable relative thereto, said tensioning mechanism having a spring connected between the adjusting wheel and the shaft, the improvement comprising a locking member adjacent the adjusting wheel, a gear engaged with the adjusting wheel and normally urged by the spring acting through the adjusting wheel into engagement with the locking member to be held against rotation, said gear shiftable out of engagement with the locking member while maintaining engagement with the adjusting wheel and rotatable for rotation of the adjusting wheel and tightening of the spring.

4,046,024

ADJUSTABLE STEERING COLUMN SUPPORT

Robert H. Broucksou, Danville, Ky., assignor to Eaton Corporation, Cleveland, Ohio

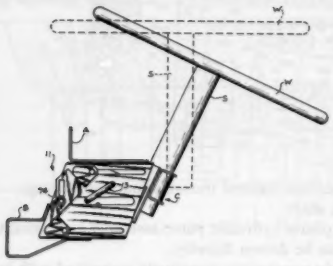
Filed Apr. 26, 1976, Ser. No. 679,947

Int. Cl.[2] B62D *1/18; G05G 5/16*

U.S. Cl. 74—493 **21 Claims**

1. Apparatus for adjustably mounting a steering column in a vehicle, comprising:

a. a frame assembly fixedly mounted within the vehicle and defining a longitudinal axis;
b. a movable member rigidly mounted to the steering column and operatively associated with said frame assembly for longitudinal and rotational movement relative thereto, said movable member including a frictional surface;
c. first and second frictional members oppositely disposed about said longitudinal axis and disposed adjacent said frictional surface;
d. said frame assembly including means for guiding the movement of said first and second frictional members relative to said frame assembly;
e. clamping means pivotally mounted to said movable member for movement therewith, said clamping means including means for actuating said clamping means, said actuating means being movable between an operative condition and a neutral condition;



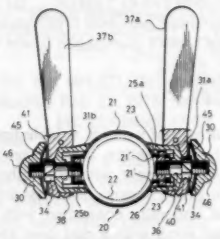
f. said clamping means, with said actuating means in said operative condition, exerting a force biasing each of said first and second frictional members into frictional engagement with said adjacent frictional surface of said movable member and with said guiding means to maintain said movable member in a fixed position relative to said frame assembly; and
g. said clamping means, with said actuating means in said neutral condition, releasing said biasing force on said first and second frictional members and permitting simultaneous longitudinal and rotational movement of said movable member relative to said frame assembly.

4,046,025

BICYCLE SPEED CHANGE LEVER DEVICE

Nobuo Ozaki, Osaka, Japan, assignor to Maeda Industries, Ltd., Osaka, Japan

Filed June 4, 1976, Ser. No. 693,128
Claims priority, application Japan, July 11, 1975, 50-96869[U]; June 7, 1975, 50-77156[U]
Int. Cl.² G05G 5/18
U.S. Cl. 74—501 R **11 Claims**



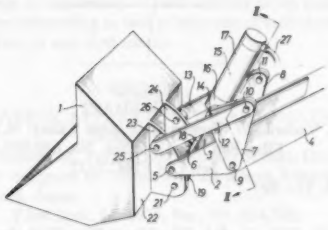
1. A bicycle speed change lever device comprising
a fixing band having at least one pair of elastically expandable open ends and are mountable onto a bicycle frame tube by expanding said open ends,
at least one inside nut holding means formed within said open ends of said fixing band,
at least one inside nut provided on said inside nut holding means,
at least one cup member mounted to said fixing band and having an internal space which permits housing said inside nut holding means with said inside nut engaged therewith,
at least one threaded shank which passes through said cup member and is engageable at its inner end with said inside nut,
at least one lever handle movably mounted on said cup member, and
at least one outside lock nut engageable with an outer end of said threaded shank.

4,046,026

LINKAGE AND MOTION SYSTEM, ESPECIALLY FOR ACCOMPLISHING A SWINGING MOVEMENT IN EQUIPMENT SUCH AS BUCKETS FOR POWER SHOVELS AND THE LIKE

Sten Ove Hammarstrand, Hudiksvall, Sweden, assignor to Svenska Hymas Aktiebolag, Hudiksvall, Sweden

Filed Jan. 5, 1976, Ser. No. 646,495
Claims priority, application Sweden, Jan. 8, 1975, 7500175
Int. Cl.² G05G 1/04
U.S. Cl. 74—519 **7 Claims**



1. A linkage and motion system especially for oscillating equipment such as buckets to excavators and the like, the equipment or its attachment being pivotably attached to a holder, characterized by a first linkage device connecting said attachment with a second linkage device which in turn is articulately joined to said holder, between said second linkage device and said attachment there being articulately attached a driving means with a linear working motion, said driving means being articulately attached to the attachment at a point at a distance from the articulation points of the holder to the attachment, the articulation points of said second linkage device being so situated that they geometrically form the corner points in a triangle, the articulation points for said first linkage means at the attachment and the articulation points for the driving means at the attachment being on either side of the articulation point of the attachment to the holder.

4,046,027

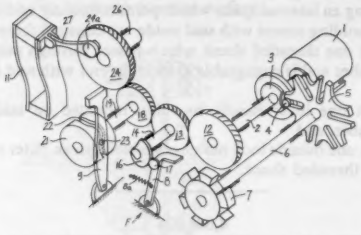
APPARATUS FOR TRANSMITTING MOTION TO TOOLS IN CIGARETTE PACKING MACHINES OR THE LIKE

Willy Rudszinat, Dassendorf, Germany, assignor to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed Apr. 7, 1976, Ser. No. 674,366
Claims priority, application Germany, Apr. 29, 1975, 2519030
Int. Cl.² F16H 53/00
U.S. Cl. 74—567 **10 Claims**

1. In a machine for the processing of smokers' products, particularly in a packing machine for cigarettes or the like, a transmission comprising a plurality of driving components; a plurality of driven components receiving motion from said

driving components; a plurality of product-treating components receiving motion from said driven components; first coupling means between at least one of said product-treating components and the associated driven component; the second coupling means between at least one of said driven components and the associated driving component, each of said coupling



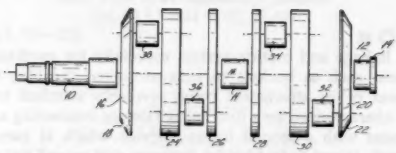
means including separable and reassemblable prefabricated portions provided on and rigid with the respective components and cooperating with each other to maintain, without any adjustment, the respective components in identical predetermined positions relative to each other subsequent to initial and each renewed assembly of such cooperating portions.

4,046,028

CRANK SHAFT

Paul F. Vachris, 57 Chester St., Locust Valley, N.Y. 11560

Filed Feb. 19, 1976, Ser. No. 659,607
Int. Cl.² F16C *3/12*
U.S. Cl. 74—597 **7 Claims**



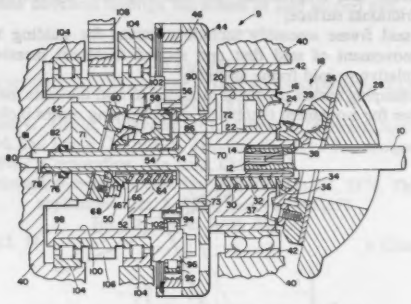
1. A crank shaft comprising a plurality of counterweights, a plurality of crank pins, two end shaft sections and an intermediate shaft section, said shaft sections being aligned and being receivable in main bearings of a crank shaft housing, each end shaft being removabley secured to an adjacent one of said counterweights, said intermediate shaft section being releasably secured to each of two adjacent counterweights and each crank pin being releasably secured to each of two adjacent counterweights, each of said counterweights, said crank pins and said shaft sections being individually separable from the remaining parts of the crank shaft, each crank pin having a central threaded hole and each counterweight having a hole aligned with said threaded hole whereby screw threaded means inserted through an opening in a counterweight and engaging said screw threaded hole of the crank pin secures to the crank pin and counterweight, each crank pin having a plurality of through holes formed therein parallel to said threaded hole and offset therefrom, said counterweights each having a corresponding plurality of holes registering with said plurality of holes in said crank pin said pluralities of holes constituting means for the reception of pin means, said pin means extending through the crank pins and into said openings of said counterweights.

4,046,029

HYDROMECHANICAL TRANSMISSION

Kenneth B. Sugden, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Sept. 10, 1976, Ser. No. 722,233
Int. Cl.² F16H *47/04*
U.S. Cl. 74—687 **8 Claims**



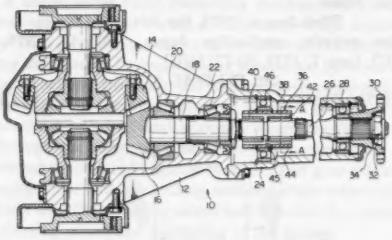
1. A hydromechanical transmission, comprising:
an input shaft;
an axial piston hydraulic pump assembly associated with said shaft to be driven thereby;
a movable swashplate operatively associated with said pump for selectively varying the displacement thereof;
an axial piston hydraulic motor assembly coaxial with said pump;
a floating valve plate disposed between and engaging said pump and said motor;
a sun gear carried by one of said pump and said motor;
a ring gear carried by the other of said pump and motor;
a rotatable output carrier coaxial with said pump; and
at least one planet gear carried by said carrier and meshed with both said sun and ring gears.

4,046,030

FINAL DRIVE UNIT

Kunihiko Suzuki, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 6, 1976, Ser. No. 674,186
Claims priority, application Japan, Apr. 9, 1975, 50-46991
Int. Cl.² F16H *1/38*
U.S. Cl. 74—710 **8 Claims**



1. In a final drive unit of a motor vehicle line, the improvement comprising, in combination, first and second drive shafts substantially in axial alignment with each other and rotatably supported by bearings in a housing, said first drive shaft having a first end portion integrally connected with a drive pinion which is in constant mesh with a ring gear and a second end portion, said second drive shaft having a first end portion interlockingly connected with a pinion drive flange which is rotatably driven by a rear universal joint and a second end portion, a vibration damping coupler for resiliently coupling

the second end portion of said first drive shaft with the second end portion of said second drive shaft, and bearing means rotatably supporting said vibration damping coupler in said housing.

4,046,031

PLANETARY-GEAR TRANSMISSION

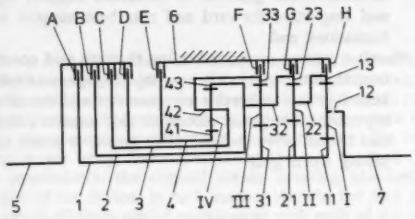
Anton Ott, Tettnang; Friedrich Ehrlinger, Friedrichshafen; Dietrich Knödler, Friedrichshafen, and Roland Zdansevicius, Friedrichshafen, all of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Oct. 6, 1975, Ser. No. 620,139

Claims priority, application Germany, Oct. 5, 1974, 2447581

Int. Cl.² F16H *57/10*

U.S. Cl. 74—764 **15 Claims**



1. A transmission providing a plurality of speed ratios between an input shaft and an output shaft, comprising:

a plurality of planetary-gear stages including a downstream stage, an upstream stage and an additional stage, ahead of said upstream stage, each of said stages consisting of a sun gear, a ring gear and a planet carrier having at least one pinion in mesh with said sun and ring gears, said downstream stage having its ring gear operatively linked with said output shaft, said additional stage having its planet carrier fixedly connected with the ring gear of said upstream stage and further having its ring gear fixedly connected with the planet carrier of said upstream stage and with the ring gear of said downstream stage;

a plurality of coaxial intermediate shafts, one of said intermediate shafts being rigid with the sun gears of said upstream and downstream stages, another of said intermediate shafts being rigid with the sun gear of said additional stage;

a plurality of clutches selectively actuatable to connect any of said intermediate shafts with said input shaft; and

a plurality of brakes selectively actuatable to immobilize the sun gear of said additional stage and the ring gears of said upstream and downstream stages whereby a plurality of forward and reverse speed ratios are establishable by the joint actuation of a selected clutch and a selected brake.

4,046,032

START CONTROL

Eugene R. Braun, Royal Oak, and Elmer A. Richards, Kalamazoo, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 404,221, Oct. 9, 1973, abandoned. This application Feb. 21, 1975, Ser. No. 551,887

Int. Cl.² B60K *41/04*

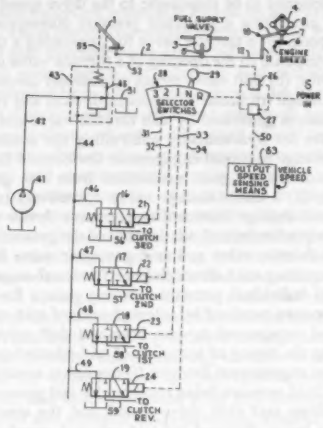
U.S. Cl. 74—865 **19 Claims**

1. A control system for a multi-ratio transmission connectable at its input to a prime mover in response to actuation of at least one of a plurality of ratio-selecting clutches and at its output to a load, said system comprising:

a manually movable throttle means having an idle position and operative to increase the speed of said prime mover in response to manual movement away from said idle position;

manually movable selector means having an inactive position and a plurality of active positions each corresponding to at least one of said clutches;

first means actuated by manual movement of said throttle means; and



means operative to actuate at least one of said clutches in response to movement of said selector to an active position corresponding to said at least one of said clutches and actuation of said first means.

4,046,033

CONTROL APPARATUS FOR AUTOMATIC TRANSMISSION

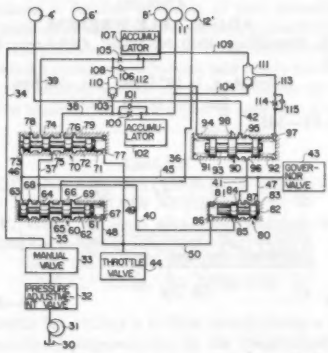
Masanao Hashimoto, Toyota, and Takaaki Suzuki, Obara, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sept. 18, 1975, Ser. No. 614,700

Claims priority, application Japan, Apr. 17, 1975, 50-45819

Int. Cl.² B60K *41/18*; F16H *47/00*

U.S. Cl. 74—869 **8 Claims**



1. A control apparatus for automatic transmissions of the type with an output shaft of an engine operatively connected to an input shaft of a speed-change gear mechanism having a speed-change planetary gear train responsive to hydraulically actuated speed-change frictional engagement devices for establishing different gear ratios, through a torque converter, and a frictional engagement device disposed in parallel to the torque converter for directly linking the output shaft to the input shaft, said control apparatus comprising means for automatically and hydraulically controlling both the selective actuation

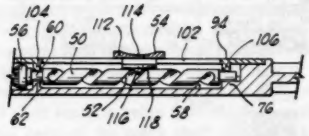
of said speed-change gear mechanism in reponse to the engine output and vehicle speed, and the selective actuation of said frictional engagement device for directly linking said output shaft to said input shaft in response to a predetermined engine output and vehicle speed, said means including (a) a governor valve designed to be responsive to the drive speed of the vehicle for generating a governor pressure corresponding to the drive speed; (b) a throttle valve for generating a throttle pressure in response to the opening of a throttle valve of the engine carburetor; (c) shift valve means operatively connected to said speed-change frictional engagement devices and responsive to the pressures generated by said throttle valve and said governor valve for hydraulically controlling the actuation of said speed-change frictional engagement devices and the shifting of said speed-change gear mechanism from one gear ratio to another; (d) a direct-linkage valve operatively connected to said direct-linkage frictional engagement device and responsive to a predetermined relationship of the pressures generated by said throttle valve and said governor valve for hydraulically actuating said direct-linkage frictional engagement device; (e) individual pressure-reducing means for controlling fluid pressure received by selected ones of said speed-change frictional engagement devices from said shift valve means and adjusting the timing of actuation of said selected speed-change frictional engagement devices; (f) operation means for accepting the fluid pressure being received by said pressure-reducing means from said shift valve means and the controlled fluid pressure being received by said selected speed-change frictional engagement devices from said pressure-reducing means; and (g) an interlock valve operatively connected to said operation means and disposed between said direct-linkage frictional engagement device and said direct-linkage valve for introducing to said direct-linkage frictional engagement device the fluid pressure from said direct-linkage valve and exhausting fluid pressure from said direct-linkage frictional engagement device in response to said fluid prssures from said operation means acting on said interlock valve, said interlock valve introducing fluid pressure to said direct-linkage frictional engagement device when receiving fluid pressure from said direct-linkage valve and exhausting fluid pressure from said directlinkage frictional engagement device when deactuated by the fluid pressures from said operation means acting on said interlock valve during a speed shift operation of said speed-change gear mechanism from one gear ratio to another.

4,046,034

ADJUSTABLE WRENCH

Harry J. Flewelling, 4040 N. Stiles, Oklahoma City, Okla. 73105

Filed Aug. 1, 1975, Ser. No. 600,896
Int. Cl.[2] B25B *13/16*
U.S. Cl. 81—165 **3 Claims**



1. In a helix-actuated open end adjustable wrench of the type having a handle portion which extends to form the head and upper jaw, and which includes a lower jaw movably retained in said head as driven by an adjusting worm gear and drive means for imparting rotation to said worm gear, the improvement comprising:

a unitarily formed elongated cavity in said handle portion which includes forward and rear base support bearing formations said elongated cavity being of generally square cross-sectional area formed in the forward approximately one-half of said handle portion and including said forward and rear at base support bearing formations at opposite ends thereof as transverse ribs having axially aligned semi-circular bearing surfaces in longitudinally central indentation therein;

a helical drive rod having a helical groove formed along the central extent thereof and which includes circumferential grooves at each end thereof for mating engagement within said axially aligned semi-circular bearing surfaces of said forward and rear base support bearing formations, and which helical drive rod is further connected at the forward end to impart rotation to said drive means;

a cover plate securable over said cavity and having an elongated central slot extending therealong, said cover plate including unitarily formed forward and rear retaining bearing formations which contact said helical drive rod circumferential grooves in rotational support opposite said respective forward and rear base support bearing formations; and

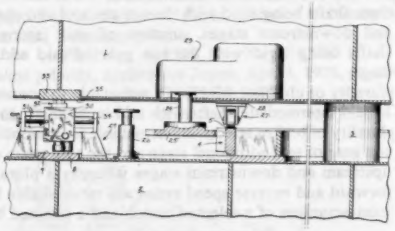
thumb actuating means extending through said cover plate central slot to project a boss into engagement with said helical groove, whereby movement of said thumb actuating means along said elongated slot imparts rotation to said helical drive rod and drive means to rotate said adjusting worm gear.

4,046,035

METHOD OF MACHINING THE UPPER PAD ON THE SWING BEARING OF A LARGE EXCAVATOR

Ellery H. Barber, South Milwaukee, Wis., assignor to Bucyrus-Erie Company, South Milwaukee, Wis.

Filed May 6, 1976, Ser. No. 683,886
Int. Cl.[2] B23B *1/00*; B23C *3/02*
U.S. Cl. 82—1 C **6 Claims**



1. In an excavator having a base which supports a center pintle, a circular swing gear disposed concentrically about the center pintle and a circular bearing pad disposed concentrically about the center pintle and radially outward from the swing gear, a method of machining an upper bearing pad which is mounted to the bottom of a revolving frame and disposed directly above the lower bearing pad, the steps comprising:

lifting said revolving frame with a set of jacks;

leveling said revolving frame;

inserting a set of temporary rollers between the bottom of said revolving frame and the top surface of said swing gear;

lowering said frame onto said temporary rollers;

mounting a metal cutting machine on said base and beneath a portion of said upper bearing pad; and

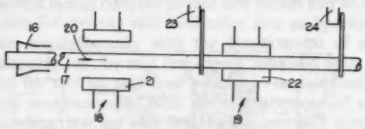
revolving said revolving frame and machining said upper bearing pad with said metal cutting machine.

4,046,036

BAR FEED MECHANISM FOR LATHES

Norman Yearsley, Kenilworth, England, assignor to Wickman Machine Tool Sales Limited, Coventry, England

Filed Oct. 28, 1975, Ser. No. 626,377
Claims priority, application United Kingdom, Nov. 14, 1974, 49264/74
Int. Cl.² B23B *13/00, 3/36*
U.S. Cl. 82—2.7 6 Claims



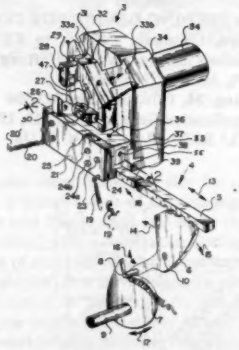
1. A bar feed mechanism for a lathe comprising a pair of bar feed devices spaced lengthwise of the feed path of bar stock in the lathe, and control means for alternatively actuating the two bar feed devices, the control means including two means for sensing the presence or absence of an end of a bar, the two sensing means being disposed adjacent the two bar feed devices respectively, the control means ensuring alternative actuation of the devices in such manner that the bar feed devices are at all times out of engagement with ends of the bar stock.

4,046,037

BOX TOOL

Joseph B. Plevyak, 19 Jefferson St., Newton, N.J. 07860

Filed May 15, 1972, Ser. No. 254,772
Int. Cl.² B23B *29/16, 29/18*
U.S. Cl. 82—35 6 Claims



1. A non-scarring set-retaining cutting tool device comprising in combination: a first lever means; a rounded rotatable-movable element having at least one lowered-surface section on at least one side of the rounded rotatable-movable element and having at least one substantially symmetrically-convexly rounded surface section of predetermined arc, said lowered section having a surface withdrawn from said convex surface and said lowered surface section being continuous with said symmetrically-rounded convex surface section serially located along the arc of said convexly surfaced section, said rounded rotatable-movable element being operatively engaged with said lever means such that movement of said lever causes said element to move rotatably of said rounded surface section in a direction along the arc substantially coincident with a convex surface of said convexly rounded surface; a movable blade-mounting member adjustably settable at different predetermined cutting positions and shaped to receive a position-lockable and position-unlockable key; at least one locking key means to lock and unlock against movement of said movable blade-mounting member in a first direction when in said receiving position; when locked in a key-receiving position, said movable blade-mounting member, said receiving position, and said rounded element being such in position relative to one-another that when said receiving position is locked by said key, rotary movement of said convexly-rounded surface section forcibly is movable of said movable blade-mounting member in first direction; and spring means for returning said movable blade mounting member from a position to which it has been moved in said first direction and for returning said lever means to a pre-actuation position; whereby movement of said lever in to and fro directions brings about movement of a mounted blade to and from said predetermined cutting position such that subsequent to cutting, scarring of a cut piece is substantially avoided by the blade being withdrawable from the cutting position before withdrawal of the cut piece; further there being at least one rotatable piece-mounting means, and movement means for movement of the movable blade-mounting member to and from a cutting position, and for transverse movement one relative to the other of the rotatable piece-mounting means and the movable blade-mounting member subsequent to movement of said movable blade-mounting member to a cutting position and for withdrawal of said movable blade-mounting member from said cutting position prior to transverse movement of one of said movable blade-mounting member and said rotatable piece-mounting means away from one-another; there being at least two lowered surface sections oppositely located and at least two convexly rounded surface sections oppositely located around a circumference of said rounded rotatable-movable element, said rounded rotatable movable element being in a substantially shaft-shaped form, and therebeing at least two separate lockable and unlockable positions for said lockable and unlockable key means which when in a second of said receiving positions is lockable and unlockable of movement of said movable blade-mounting member in an about opposite second direction relative to said first direction, said movable blade-mounting member being movable by contact movement of one of said convexly rounded surface section solely when one of said receiving positions is in an unlocked state while the other is in a locked state, such that when the second one of said second receiving positions is locked while simultaneously a first of said receiving positions is unlocked, said rotary movement of a second of said convexly rounded surface sections is forcibly movable of said movable blade-mounting member in said second direction, and such that when the first of said positions is unlocked while simultaneously the second receiving position is unlocked, said rotary movement of said convexly-rounded surface section is forcibly movable of said movable blade-mounting member in said first direction.

4,046,038

METHOD AND APPARATUS FOR CUTTING OPEN HOLLOW ARTICLES

Theodore V. West, Michigan City, Ind., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 1, 1976, Ser. No. 737,470
Int. Cl.² B23B *1/00, 3/06, 3/04*
U.S. Cl. 82—47 8 Claims

1. Apparatus for cutting a hollow article along a severing plane substantially perpendicular to the longitudinal axis of said article, said apparatus comprising:

A. a knife support;

B. a knife comprising

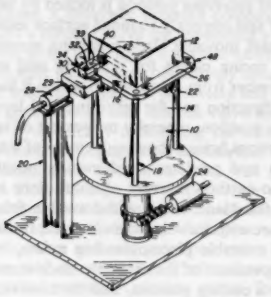
i. an arm, said arm being pivotally mounted to said knife support about an axis substantially parallel to said longitudinal article axis,

ii. at least one blade clamp pivotally mounted to said arm about an axis lying approximately in said severing plane, and

iii. a blade mounted in said blade clamp, said blade having a cutting edge extending in a direction away from said

arm toward said article and terminating in a point for piercing said article;

C. means for providing relative movement between said knife said and article around the periphery thereof;



D. means for directing said knife support toward said longitudinal article axis whereby said article may be cut; and

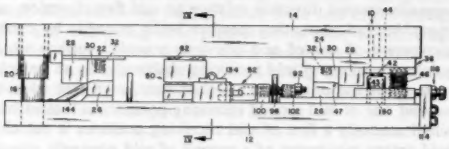
E. means for controlling the pivoting of said knife arm relative to the shape of said article to maintain said blade in cutting relation to said article.

4,046,039

THICKNESS RESPONSIVE VARIABLE POSITION DIE SET

Melbourne L. Griesbach, Muskegon, Mich., assignor to EMF, Inc., Muskegon, Mich.

Filed May 5, 1976, Ser. No. 683,044
Int. Cl.² B26D *5/06, 7/26*
U.S. Cl. 83—13 **25 Claims**



1. A variable-position die set adapted for precisely cutting sheet stock to a specified size as a function of blank thickness, comprising:

a first actuating die plate;

a second actuating die plate superimposed on said first die plate in a spaced, vertical relationship therewith;

a shiftable cutting means positioned between said die plates for severing the edge of the stock upon closing movement of said actuating die plates;

means operatively coupled to said die plates for sensing the thickness of the blank; and

means operatively associated with said sensing means for shifting said cutting means a distance proportional to the sensed thickness of the stock prior to severing of the edge by said cutting means.

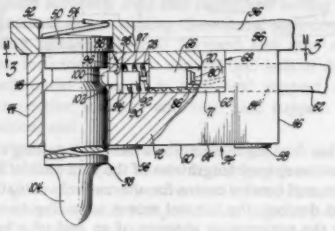
4,046,040

PROGRESSIVE DIE SENSOR

Charles A. Bourdo, 3301 Willet, Pontiac, Mich. 48057

Filed July 6, 1976, Ser. No. 702,554
Int. Cl.² B26D *7/22*
U.S. Cl. 83—63 **7 Claims**

1. A progressive die sensor comprising: a housing for mounting on an upper punch holder; said housing including opposite side surfaces and an upper mounting surface that engages the upper punch holder when the housing is mounted thereon; a depression that opens upwardly in the housing along the mounting surface thereof and has opposite sides opening to the side surfaces of the housing and a rectangular cross section therebetween; means for mounting a downwardly extending probe on the housing in a spaced relationship from the depression for relative movement that indicates an unaligned workpiece condition; a switch received within the depression and including an actuating plunger; a switch cover secured within the housing depression and having downwardly extending side portions of rectangular cross sections between which the switch is received; said switch cover including an upper surface that defines a continuation of the upper mounting surface



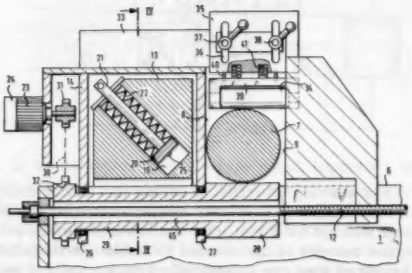
of the housing and which engages the punch holder along with the housing mounting surface during mounting thereon; said side portions of the switch cover including surfaces that form a continuation of the housing side surfaces at the opposite sides of the depression; means for positioning the switch with respect to the housing and the cover in the depression; and a push rod extending between the probe and the switch plunger to actuate the switch in response to probe movement indicating an unaligned workpiece condition such that an electrical signal may be generated when such a condition occurs.

4,046,041

CLAMPING AND FEEDING DEVICE FOR COLD SAWS

Paul Stolzer, Achern, Germany, assignor to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co Kommanditgesellschaft, Achern, Germany

Filed Aug. 24, 1976, Ser. No. 717,396
Claims priority, application Germany, Sept. 19, 1975, 2541781
Int. Cl.² B23D *49/04, 51/04, 51/18*
U.S. Cl. 83—210 **16 Claims**



1. In a device for feeding a workpiece to the saw component of a sawing maching and for clamping the workpiece during the cutting thereof by the saw component; the sawing machine having a machine frame and a machine table; the device having first and second clamping jaws supported on the machine table and cooperating with one another for immobilizing the workpiece; a feed roller supported at the machine table in the zone of the clamping jaws for feeding the workpiece into the operational range of the saw component; and means for driving the feed roller; the improvement comprising

a. first means connected to said first clamping jaw for dis-

placing said first clamping jaw towards and away from said second clamping jaw in a direction inclined with respect to the surface of said machine table for setting said first clamping jaw to a relatively short distance from said surface of said machine table into a closed position in which it presses the workpiece against said second clamping jaw and for setting said first clamping jaw to a relatively large distance from said surface of said machine table into an open position in which it releases the workpiece; and

b. second means coupled to said first means and to said feed roller for moving said feed roller into an operative position simultaneously with the displacement of said first clamping jaw, by said first means, into said open position and for moving said feed roller into an inoperative position simultaneously with the displacement of said first clamping jaw, by said first means, into said closed position; in said operative position said feed roller projecting, at least partially, beyond said surface of said machine table for engaging and advancing the workpiece and in said inoperative position said feed roller being withdrawn below said surface of said machine table.

4,046,042

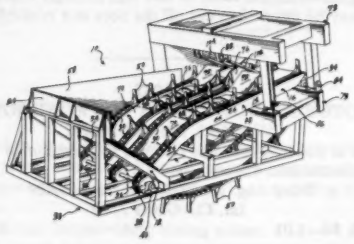
CIRCULAR SHEAR CUTTING DEVICE

Marcel Payeur, Plessisville, Canada, assignor to Forano Limitee, Quebec, Canada

Filed Mar. 22, 1976, Ser. No. 669,150

Int. Cl.² B27M *1/00*; B23D *19/04*; B26D *1/24*

U.S. Cl. 83—418 **12 Claims**



1. A circular shear cutting device for cutting tree lengths comprising: a frame; a pair of circular shear blades rotatably mounted on said frame, each said blade including a periheral portion provided with a continuous cutting edge, the peripheral portions of said blades being in partially overlapping relation to one another; first drive means for rotating said blades in opposite direction to one another; means for successively conveying tree length transversely to said pair of blades; second drive means causing said conveying means to advance tree lengths to a first of said pair of rotating blades, said conveying means cooperating with at least one of said blade to move said tree lengths to the overlapping peripheral portions of said blades where said cutting edges gradually penetrate the conveyed tree length to effect a shear cutting action therethrough.

4,046,043

DEVICE FOR CONVEYING AND CUTTING A PILE OF SHEETS

Hermann Kistner, Tamm, and Gunthart Lehmann, Heubach, Lautern, both of Germany, assignors to Maschinenbau Oppenweiler GmbH, Oppenweiler, Germany

Filed Mar. 31, 1976, Ser. No. 672,435

Claims priority, application Germany, Apr. 4, 1975, 2514837

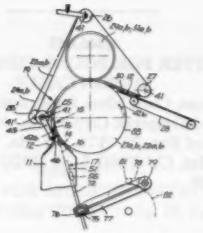
Int. Cl.² B26D *7/06*

U.S. Cl. 83—425.4 **23 Claims**

1. A device for conveying and cutting a pile of sheets comprising:

a frame;

a conveyor for feeding the pile of sheets in a conveying direction, said conveyor including a first conveyor element having a convex cylindrical circumferential surface and being mounted on said frame for rotation of said cylindrical surface around an axis extending at right angles to said conveying direction and a second conveyor element forming an endless belt having an endless circumferential surface, deflecting means for mounting said endless belt on said frame for revolution along an endless path around an axis of revolution parallel to said axis of rotation, so that a portion of said belt is deflected by a segment of said cylindrical surface of said first conveyor element, first and second endless conveyor surfaces supported by said segment and said portion of said belt, respectively, and defining a clamping gap there-between for clamping the pile of sheets and for conveying the pile of sheets along said gap;



a disk-knife rotatably mounted about an axis parallel to said axis of revolution, said disk-knife having two sides, one of said sides having a rim, said rim being surrounded by a circular cutting edge, at least said rim of said one side and said cutting edge defining a common plane, said plane extending at right angles to said axis of rotation; and

first drive means for driving at least one of said conveyor elements and second drive means for rotating said disk-knife;

said first and second conveyor surfaces having edges, said conveyor being arranged so that a portion of said planar rim and said cutting edge overlaps said edges of said first and second conveyor surfaces, said edge of said first conveyor surface being in contact with said cutting edge and said edge of said second conveyor surface being located adjacent said cutting edge, so that said disk-knife and said first conveyor surface constitute a cutting device for cutting a pile of sheets clamped in said clamping gap adjacent to said cutting edge.

4,046,044

PAPER TRIMMERS

Donald MacDougal Paterson, deceased, late of London, England, and by Alexander Robertson Brackenridge, executor, 2-6 Boswell Court, London WC1N 3PS, England

Filed Nov. 20, 1975, Ser. No. 633,672

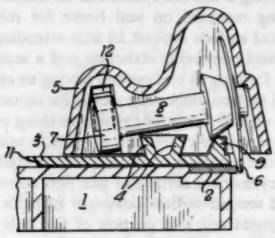
Claims priority, application United Kingdom, Nov. 26, 1974, 51138/74

Int. Cl.² B26D *1/20*

U.S. Cl. 83—489 **4 Claims**

1. In a paper trimmer comprising a base board and a fixed cutter blade set in one edge of the board, the improvement comprising a guide rail mounted above and closely spaced from the cutter blade and a carriage mounted on the guide rail, the carriage containing a cutter wheel abutting the fixed blade and adapted to be turned, as the carriage is slid on the guide, by engagement of a friction drive wheel, coupled to the cutter

wheel, with the upper surface of the guide rail, said guide rail including means for maintaining the axis of rotation of the



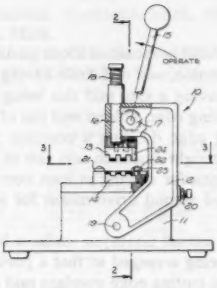
cutter wheel at an acute angle relative to the plane of said board.

4,046,045

WIRE SPLITTER FOR ROUND CONDUCTOR FLAT RIBBON CABLE

Charles H. Stevens, Costa Mesa, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,007
Int. Cl.[2] B26D *5/10*; H02G *1/12*
U.S. Cl. 83—620 **7 Claims**



1. A device for preparing a flat multi-conductor ribbon cable having a plurality of individually insulated conductors of circular cross section for termination into a flat cable connector, said cable having webs between the insulation coverings of each of the individual conductors, by selective splitting said webs between groups of at least one adjacent conductor per group, said splitting being effected over a first predetermined dimension along the length of said cable, comprising:

first means comprising upper and lower meshing cutter blades each containing a plurality of spaced cutter sections, each of said sections having a number of adjacent troughs of concave cross section equal to the number of said conductors in the corresponding one of said groups, said troughs being elongated in the length dimension of said flat cable, and each of said cutter sections having cutting edges at the lines of meshing with the adjacent sections of the other of said cutters to shear said webs between said groups of conductors;

second means comprising means for supporting said cutter blades and for imparting motion to at least one of said blades, said sections of each of said cutters producing a shearing action by meshing within the spaces between adjacent cutter sections of the other cutter;

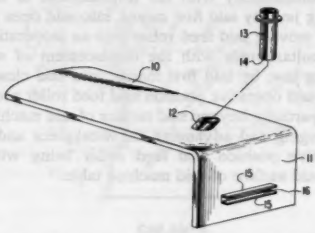
and third means comprising a convex-shape extant on the surface of at one of said cutter blades facing the other of said blades, said convex shape corresponding to a curve in a plane parallel to said troughs, thereby to provide two progressing points of shear from a central point in the direction of said cable length, one progressing to one end of said convex shaped cutter blade and the other to the other end thereof.

4,046,046

MEAT CORING DEVICE INCLUDING A TEMPLATE

Gerald L. Pearson, Spencer, Iowa, and Harold J. Tuma, Brookings, S. Dak., assignors to Spencer Foods, Inc., Spencer, Iowa

Filed Aug. 9, 1976, Ser. No. 712,810
Int. Cl.[2] B26F *1/32*
U.S. Cl. 83—745 **3 Claims**



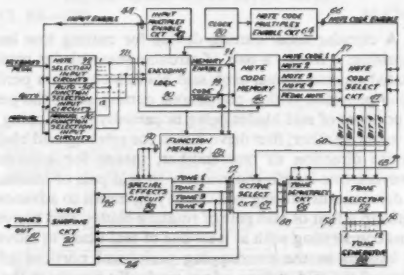
1. A tool for removing a core from a carcass comprising template means having two legs perpendicular to each other, one of said legs being formed to provide a hole therethrough, core cutting means slidably disposed in said hole and being guided by the walls thereof at a controlled angle, and knife guiding means on the other of said legs through which a knife blade may be inserted to cut off the core at a controlled position.

4,046,047

NOTE SELECTOR CIRCUIT FOR ELECTRONIC MUSICAL INSTRUMENT

Patrick S. Roberts, Glendale Heights, Ill., assignor to Warwick Electronics Inc., Chicago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,859
Int. Cl.[2] G10H *1/00*
U.S. Cl. 84—1.01 **18 Claims**



1. In an electronic musical instrument having means for providing input signals carrying note selection and note sequence function selection information, means for generating tones, and means for controlling the tone generating means in accordance with note and note sequence function selection information supplied thereto, an improved circuit for supplying information to the control means, comprising:

means for multiplexing together, on a time division basis, the note and note sequence function selection input signals: an encoding circuit responsive to the multiplexed signals for providing binary coded signals respectively representative of the note selection and function selection information carried thereby;

storing means including a note memory for storing said note

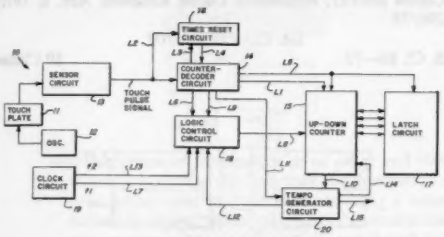
selection codes and a function memory for storing said function selection codes; and demultiplexing means including means responsive to the code signals and said multiplexing means for respectively enabling the note memory and the function memory during the time divisions that said note selection signals and function selection signals are being applied to the encoding logic input means whereby the note selection codes and the function selection codes representative of the information carried by the multiplexed signals are respectively stored in said note and function memories.

4,046,048

DIGITAL TOUCH RESPONSIVE TEMPO GENERATING DEVICE

Angelo A. Bione, Chicago, Ill., assignor to Hammond Corporation, Chicago, Ill.

Filed June 24, 1976, Ser. No. 699,329
Int. Cl.² G10F *1/00*
U.S. Cl. 84—1.03 **12 Claims**



1. A tempo generating device for a rhythm instrument comprising:

a touch detector circuit repetitively actuatable by an instrument player at a desired tempo for producing touch control signals defining a time interval corresponding to said tempo;

a clock means for providing timing pulses;

a digital circuit having a memory energized by said touch control signals and responsive to said timing pulses for determining and retaining a digital value representative of said time interval and for repetitively producing output pulses; and

generator means responsive to said repetitive output pulses from said digital circuit for producing tempo pulses spaced apart as a function of said time interval.

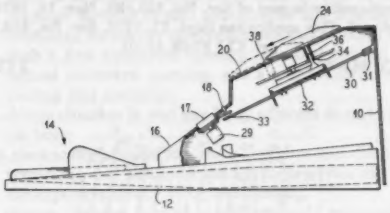
4,046,049

FOOT CONTROL APPARATUS FOR ELECTRONIC MUSICAL INSTRUMENT

David A. Luce, Clarence Center, and Anthony Marchese, Cheektowaga, both of N.Y., assignors to Norlin Music, Inc., Williamsville, N.Y.

Filed June 14, 1974, Ser. No. 479,539
Int. Cl.² G10H *1/02*; H01C *10/10*
U.S. Cl. 84—1.11 **9 Claims**

1. For use with a foot-controlled electronic musical instrument, a variable element for varying an electrical parameter, a case for housing said variable element, a movable operating member connected with said variable element for controlling said parameter, said operating member being adapted for rectilinear movement by the foot of the player of the instrument, means for mounting said operating member in slidable relation with a wall of said case, means for mounting said variable element directly on the other side of said wall from said operating member, and link means for connecting said variable element with said operating member whereby the force transmitted to said operating member by said player's foot is resisted by said wall and is not transmitted to said variable element.

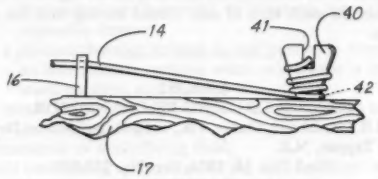


4,046,050

STRING POST FOR MUSICAL INSTRUMENTS

C. Leo Fender, 2851 Rolling Hills Drive Sp. 33, Fullerton, Calif. 92635

Filed Feb. 23, 1976, Ser. No. 660,640
Int. Cl.² G10D *3/14*
U.S. Cl. 84—304 **2 Claims**



1. A musical instrument comprising:

a neck;

a plurality of strings extending longitudinally across said neck;

a nut extending laterally across one end of said neck, perpendicular thereto, said nut having a plurality of grooves in the outer surface thereof, one for each of said strings;

a head connected to said one end of said neck; and

a plurality of string posts extending through said head, perpendicular thereto, each of said string posts having a slot extending laterally thereacross, from the outer end thereof, for receipt of first ends of said strings, said strings being adapted to be wrapped around said string posts and said posts being rotatable to tighten the strings connected thereto, said string posts having a constantly decreasing diameter from said outer ends thereof to a first plane which is positioned virtually at said instrument head and a constantly increasing diameter from said first plane to a second plane which is coplanar with said instrument head so as to form a curved concave shoulder at the base of said posts whereby as said string posts are rotated to tighten said strings, the lowermost wrap of each string is urged toward and into said shoulder at the base of said posts and into contact with said instrument head to maximize the pressure between said strings and said instrument nut.

4,046,051

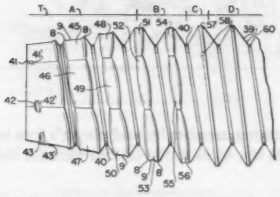
THREAD FORMING SCREW

Louis J. Lovisek, Greenlawn, N.Y., assignor to Industrial Fasteners Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 523,689, Nov. 14, 1974, abandoned. This application Sept. 17, 1975, Ser. No. 614,179

Int. Cl.² F16B *33/02*

U.S. Cl. 85—47 **2 Claims**



1. A thread forming screw comprising, in combination, a lead end, a shank, progressively higher threads extending from said lead end on to said shank, at least some of said progressively higher threads having flat areas at the thread crests with adjacent flat areas intersecting to form sharp longitudinal line crests with slightly higher ends, said flat areas being of progressively increasing height and decreasing width away from said lead end, a transition portion having at least one turn of a thread thereon having substantially identical flat areas at the thread crest with adjacent flat areas intersecting to form longitudinal line crests with slightly higher ends, said line crests of said transition portion being of substantially the height of the crests of said threads on said shank, and progressively smaller flat areas on the crest of said thread between said transition portion and said shank, said shank having a full thread with a continuous crest thereon, said thread crest having seven of said flat areas for each turn of said thread having said flat areas thereon.

4,046,052

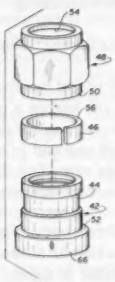
TORQUE LIMITING RF CONNECTOR

Donald B. Nordstrom, Stuart, Fla., assignor to Solitron Devices, Inc., Tappan, N.J.

Filed Oct. 14, 1976, Ser. No. 732,203

Int. Cl.² F16B *31/02*

U.S. Cl. 85—61 **11 Claims**



1. An RF coupling nut comprising:

an RF cable body;

a base ring to support said cable body, said base ring having internal connecting means at one end for the coupling of said cable body therewithin, a shoulder and an elongated body above said shoulder, said elongated body having a grooved surface;

a tension ring rotatably supported within said grooved surface on said base ring, said tension ring having a cross sectional thickness such that it presents an external diameter greater than said elongated body but less than said shoulder; and

a hex ring having an internal groove of a diameter less than the external diameter of the tension ring compressing said tension ring between and into frictional engagement with said base ring and said hex ring, said hex ring having one end resting against said shoulder when connected to said base ring by said tension ring, said frictional engagement providing frictional connection between the hex ring and base ring that is torque limiting in that said hex ring bidirectionally drives said base ring via said tension ring which is free to rotate when a torque is reached exceeding frictional contact of said tension ring with either or both said base ring or hex ring.

4,046,053

BLIND RIVET

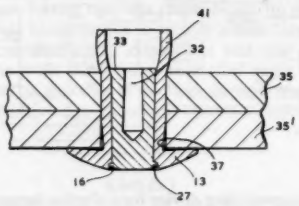
Zia Raheem Alvi, Hatfield; William David Bradley; Keith Denham, both of Welwyn Garden City, and Frederick Arthur Summerlin, Wheathampstead, all of England, assignors to Aerpat A.G., Zug, Switzerland

Filed Mar. 29, 1976, Ser. No. 671,149

Claims priority, application United Kingdom, Apr. 1, 1975, 13290/75

Int. Cl.² F16B *13/08*

U.S. Cl. 85—72 **10 Claims**



1. A blind rivet comprising a tubular shell having a bore throughout its length, and a mandrel, said mandrel comprising an elongate stem and an enlarged head and having a breaker groove at the junction of the stem and head, the head of the mandrel having a part adjacent to the breaker groove, said part comprising a core having an external diameter at least as great as the diameter of the stem, and a skirt peripherally surrounding said core, said skirt and said core presenting a common face defining a side of said breaker groove and facing towards the stem, said mandrel head being adapted to radially expand said tubular shell and thereby form a blind head when pulled into the bore of the shell, and said skirt being deformable outwardly into engagement with the shell to assist in locking the mandrel head in the expanded shell.

4,046,054

FLARABLE THREADED FASTENER

Bulent Gulistan, Malibu, Calif., assignor to Deutsch Fastener Corporation, Los Angeles, Calif.

Filed Aug. 5, 1976, Ser. No. 712,100

Int. Cl.² F16B *13/06*

U.S. Cl. 85—74 **10 Claims**

1. A fastener comprising

a sleeve of malleable material, said sleeve having

a cylindrical exterior surface,

a head at one end thereof,

and a cylindrical bore therethrough,

said bore including a counterbore adjacent the opposite end of said sleeve, whereby said sleeve at said opposite end has a reduced-thickness bendable wall,

a screw, said screw having

a head,

and a shank extending from said head, said head of said

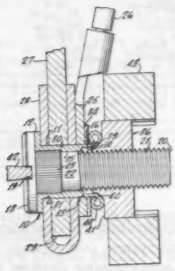
screw overlying said head of said sleeve, and having surface means for engagement by a driving tool, said shank being longer than said sleeve and having a threaded outer portion projecting outwardly from said opposite end of said sleeve,

said sleeve and said screw including cooperative means for preventing relative movement of said sleeve and said screw,

and a separate, threaded nut received on said threaded end of said shank, said nut being rotatable relative to said shank and to said sleeve, and having

surface means adapted for engagement by a driving tool,

an axial protuberance at the end thereof adjacent said opposite end of said sleeve,



said protuberance terminating in an outer end thereof which is of smaller diameter than the diameter of said counterbore, said protuberance including a concave surface diverging radially outwardly from said end of said protuberance to a substantially radial wall axially inwardly of said protuberance, whereby upon relative rotation of said nut and said shank so as to advance said nut towards said opposite end of said sleeve,

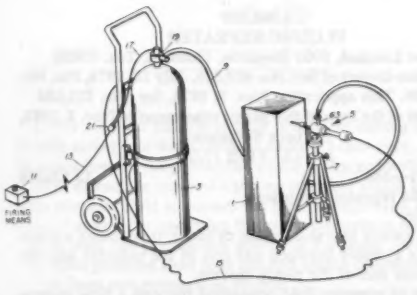
said protuberance is caused to enter said counterbore and said concave surface to bend said relatively thin wall outwardly for forming a flange on said opposite end of said sleeve.

4,046,055

APPARATUS FOR SAFELY NEUTRALIZING EXPLOSIVE DEVICES

Richard T. McDanolds, and Rodney W. Jordan, both of Newton, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 18, 1975, Ser. No. 601,239
Int. Cl.[2] F42D 5/04
U.S. Cl. 86—1 B **7 Claims**



1. An implement for use in neutralizing an explosive device from a safe distance, comprising:

a gun body comprising a cylindrical bore and a contiguous cylindrical counterbore of reduced diameter;

a captive piston comprising a cylindrical head slidable in said bore, a contiguous cylindrical stem or rod of reduced diameter slidable in said counterbore and a pointed end extending forwardly therefrom; said piston being formed with a first transverse opening near said pointed end, a second transverse opening, and a longitudinal bore connecting said openings;

a charge chamber in said gun body adjacent to said cylindrical bore;

an electrically initiated explosive charge in said chamber for propelling said piston forwardly, to penetrate the wall of the explosive device to be neutralized;

a plenum chamber formed in said gun body surrounding an intermediate portion of said piston and in registration with said second transverse opening when said piston is in its forward position; and

means for connecting said plenum chamber to a source of neutralizing fluid.

5. A system for neutralizing an explosive device comprising:

an explosive device;

an implement comprising:

a gun body comprising a cylindrical bore and a contiguous cylindrical counterbore of reduced diameter;

a captive piston comprising a cylindrical head slidable in said bore, a contiguous cylindrical stem or rod of reduced diameter slidable in said counterbore and a pointed end extending forwardly therefrom and positioned adjacent to said explosive device; said piston being formed with a first transverse opening near said pointed end, a second transverse opening, and a longitudinal bore connecting said openings;

a charge chamber in said gun body adjacent to said cylindrical bore;

an electrically initiated charge in said chamber for propelling said piston forwardly, to penetrate the wall of said explosive device;

a plenum chamber formed in said gun body surrounding an intermediate opening when said piston is in its forward position; and

means for connecting said plenum chamber to a source of neutralizing fluid;

a container of neutralizing fluid;

fluid conducting means connecting said container with said connecting means of said implement; and

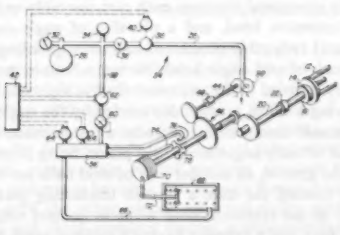
electrical means, located at a safe distance from said device and electrically connected with said explosive charge of said implement, for initiating said explosive charge to cause said piston to penetrate said explosive device.

4,046,056

PNEUMATIC GUN SYSTEM AND METHOD

George W. Carrie, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Apr. 5, 1976, Ser. No. 673,790
Int. Cl.[2] F41D 7/02
U.S. Cl. 89—12 **24 Claims**



1. In combination with a gatling gun having a plurality of

firing chambers, a substantially continuously rotating power drive shaft, intermittent motion means capable of being driven by said shaft for intermittently rotating said chambers sequentially into firing position, and drive means supplied with gas exhausted from said chambers and effective to drive said intermittent motion means after firing has been initiated; a starting system for effecting initial rotation and acceleration of said shaft and firing of said gun, comprising:

a continuously rotatable pneumatic motor separate from said drive means and disposed in driving relationship with said shaft;

a source of pressurized gas disposed remotely from said gun;

conduit means communicating said source with said motor; and

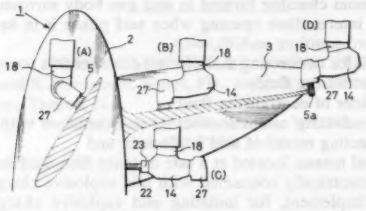
a solenoid operated flow shut-off valve disposed in said conduit means in a normally closed position blocking flow to said motor, said valve shiftable to an open position for permitting delivery of pressurized gas from said source to energize said motor and effect initial rotation and acceleration of said shaft and firing of said gun.

4,046,057

PROPELLER MILLING MACHINE

Yoshiaki Imamura, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 27, 1974, Ser. No. 527,739
Claims priority, application Japan, Jan. 12, 1974, 49-6788
Int. Cl.² B23C *3/18*
U.S. Cl. 90—14 **3 Claims**



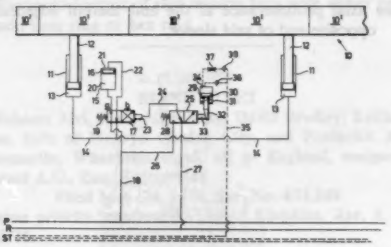
1. A propeller milling machine comprising a double-column bridge under which a work is to be placed, a horizontal crossrail laid on the bridge, a plurality of ram assemblies, each assembly containing a corresponding shaft, said plurality of assemblies supported by the crossrail to traverse horizontally thereon and to move vertically at right angles to the rail, a plurality of extension heads each with a built-in extension shaft coupled to the associated ram shaft, a plurality of inclined couplers each of which has at least one inclined face and is turnably interposed between each ram assembly and the associated extension head, and a plurality of angle heads, each angle head swingably connected to a corresponding extension head, each of said angle heads having a built-in main spindle rotatably coupled to the extension shaft at right angles thereto for driving a milling cutter also carried by the angle head and wherein said clamp means includes a piston made fast to the rear end of each angle head, said piston being formed with a diametral groove, an annular row of steel balls movable in the groove toward the axis, a flexible contacting part, a sleeve secured to the extension head while in contact with the contacting part, and a cylinder having a inclined plane for contact with the steel balls, said piston and cylinder wall defining hydraulic fluid chambers in the cylinder.

4,046,058

CONTROL SYSTEMS AND ARRANGEMENTS FOR USE IN MINERAL MINING INSTALLATIONS

Hans Theodor Grisebach, Unna, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Westfalia, Germany

Division of Ser. No. 423,483, Dec. 10, 1973, Pat. No. 3,965,797.
This application Nov. 17, 1975, Ser. No. 632,191
The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.
Int. Cl.² F15B *13/04*
U.S. Cl. 91—32 **3 Claims**



1. A system for controlling the operation of shifting rams in a mine working, said system comprising:

a. a plurality of apportioning devices each allocated to at least one of the shifting rams, each said apportioning device having a cylinder containing a floating piston, said cylinder having a first working chamber on one side of said piston and a second working chamber on the other side of said piston, first conduit means for normally connecting said first working chamber to a pressure fluid supply, second conduit means for normally connecting said second working chamber to the working chamber of said at least one ram, a connecting valve mounted in parallel across said first and said second conduit means, said connecting valve having two alternative switching positions, the first position permitting said first and second conduit means to remain in their normally connected condition, the second position connecting said first working chamber to the working chamber of said at least one ram, and said second working chamber to the pressure fluid supply;

b. a stepping mechanism operating said connecting valve; and

c. control signal means for actuating said stepping mechanism to operate said connecting valve to cause a selected apportioning device to perform an operative cycle to transfer a predetermined volume of pressure fluid to the working chamber of said at least one ram, the volume of pressure fluid being a fraction of the total capacity of the working chamber.

4,046,059

FLUIDIC REPEATER

Willie Burt Leonard, 5902 Royalton, Houston, Tex. 77036

Continuation-in-part of Ser. No. 489,829, July 18, 1974, Pat. No. 3,988,966. This application Nov. 5, 1974, Ser. No. 521,036
The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.
Int. Cl.² F15B *13/16*
U.S. Cl. 91—388 **13 Claims**

1. Fluidic repeater comprising

a cylinder

a piston axially movable in said cylinder, there being a space in said cylinder between one end of the cylinder and the adjacent end of the piston therein,

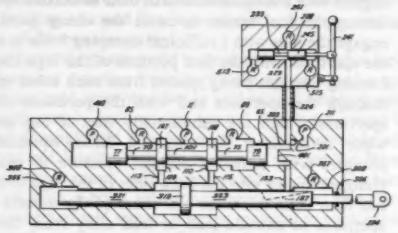
a source of pressure fluid connected through a flow restrictor to supply fluid to said space between one end of the cylinder and the adjacent end of the piston therein,

opposition means to supply an opposing force on the other end of the piston,

a fluid reservoir at lower pressure than said source connected through parallel variable flow restrictors to said space,

one of said variable flow restrictors constituting a transmitter for varying the pressure in said space and thereby cause a responsive change in the position of said piston relative to said cylinder, said force of the opposition means being independent of the position of said transmitter, and

feedback means including another of said variable restrictors



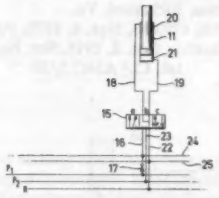
actuated in response to change of position of said piston relative to said cylinder to restrict flow through said other variable restrictor a greater amount when said one restrictor is moved to a position restricting flow a lesser amount, and to restrict flow through said other variable restrictor a lesser amount when said one restrictor is moved to a position restricting flow a greater amount, said amounts being independent of the rate of movement of said piston relative to said cylinder and the duration of said change of position of said piston, thereby to cause an opposite change in the pressure in said space from that caused by the transmitter restrictor and bring the piston to rest relative to said cylinder.

4,046,060

HYDRAULIC CONTROL SYSTEMS FOR USE WITH MINING APPARATUS

Kunibert Becker, Werl, and Walter Weirich, Dortmund, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Westfalia, Germany

Filed Aug. 4, 1975, Ser. No. 601,643
Claims priority, application Germany, Aug. 22, 1974, 2440211
Int. Cl.[2] F15B *11/16*
U.S. Cl. 91—414 **5 Claims**



1. For use with mineral mining equipment having a series of double-acting hydraulic rams for shifting a conveyor, each ram having a first working chamber which is charged with pressure fluid to extend the ram and a second chamber which is charged with pressure fluid to retract the ram, an improved hydraulic control system for operating the rams, said system comprising:

a. at least one pressurized source of hydraulic fluid;

b. main pressure fluid feed conduit means connected to said at least one pressurized source;

c. pressure fluid return conduit means connected to said at least one pressurized source;

d. further pressure fluid feed conduit means connected to said at least one pressurized source;

e. regulating means for varying the pressure of the fluid in said further conduit means; and

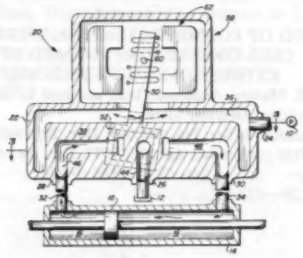
f. a plurality of control devices each associated with at least one of the rams and connected to the working chambers of the rams on the one hand, and connected to said main conduit means, and to said further conduit means, and to said return conduit means on the other hand, each said control device selectively connecting the working chambers with various combinations of said conduit means, each said control device having three intake ports and two outlet ports, said first intake port connected to said main conduit means, said second intake port connected to said further conduit means, and said third intake port connected to said return conduit means; said first outlet port connected to the second working chamber of the associated ram, and said second outlet port connected to the first working chamber of the associated ram, each said control device adjusting the three operative states comprising: a first state wherein said first intake port is connected to said first outlet port, said second intake port is connected to second outlet port, and said third intake port is blocked; a second state wherein said third intake port is connected to both said first and said second outlet ports, and said first and said second intake ports are blocked; and a third state wherein said first intake port is connected to said first outlet port, said third intake port is connected to said second outlet port, and said second intake port is blocked; and wherein adjusting said control device to the first state causes the ram to extend, and adjusting said control device to the third state causes the ram to retract.

4,046,061

FOUR-WAY CLEVIS VALVE AND METHOD

Richard F. Stokes, Phoenix, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 3, 1975, Ser. No. 637,441
Int. Cl.[2] F15B *13/044*; F16K *11/00*
U.S. Cl. 91—459 **3 Claims**



1. In combination with a fluid control system including a source of pressurized fluid, a low pressure reservoir, and a fluid operated motor having a pair of motor ports communicating with opposed fluid chambers of the motor; a closed center flow control valve comprising:

a housing having an internal cavity, an inlet port communicating with said source of fluid, an exhaust port communicating with said reservoir, and a pair of work ports communicating with said motor ports, said internal cavity communicating with one of said inlet and outlet ports;

means in the housing defining a pair of substantially flat, opposed, transversely spaced surfaces exposed to said cavity, said means having a first passage therein communicating with the other of said inlet and outlet ports, and second and third passages therein communicating with said work ports, each of said first, second and third passages opening onto both of said opposed surfaces at later-

ally spaced locations therealong with said first passage disposed intermediate said second and third passages;

a longitudinally extending control member in said housing having a bifurcated end straddling said means defining said opposed surfaces, said member pivotally mounted to said housing whereby said bifurcated end shifts primarily laterally along said surfaces as the member pivots;

a pair of cup elements affixed to said bifurcated end of the control member, each of said cup elements having a continuous, flat peripheral wall slightly spaced from the adjacent surface and cooperating therewith to define a fluid transfer zone between the cup element and the adjacent surface;

said member pivotal to shift said cup elements laterally in one direction from a first central position wherein said peripheral walls substantially cover said second and third passages toward a second position wherein said first and second passages are interconnected through said fluid transfer zones while said third passage is open to said internal cavity, said member pivotal to shift said cup elements laterally in an opposite direction from said first position toward a third position wherein said first and third passages are interconnected through said fluid transfer zones while said second passage is open to said internal cavity; and

solenoid operated actuator means carried by said housing and operable upon the end of said control member opposite said bifurcated end for selectively pivoting said control member to shift said cup elements in said one and said opposite directions, said peripheral walls of the cup elements operable to variably meter fluid communication of said first passage respectively with said second and third passages through said fluid transfer zones while providing substantially balanced flows through said transfer zones as said cup elements respectively shift in said one and said opposite directions, said peripheral walls being of slightly less width than the openings on said surfaces communicating with said second and third passages to permit restricted communication directly between each of said second and third passages and said cavity in said first central position of said member.

4,046,062

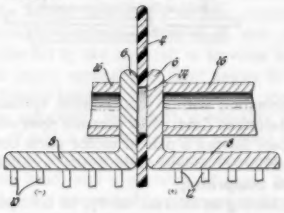
METHOD OF FORMING THROUGH THE PARTITION CELL CONNECTORS FORMED BY AN EXTRUSION-FUSION TECHNIQUE

Robert C. Matter, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 785,698, Dec. 20, 1968, abandoned. This application Apr. 15, 1971, Ser. No. 134,442

Int. Cl.[2] H01M 6/00

U.S. Cl. 29—623.1 **4 Claims**



1. A method of making substantially liquid-tight intercell connections for lead-acid storage batteries of the type having (a) nonconductive partitions dividing the case of the battery into compartments, (b) apertures in the partitions connecting adjacent compartments, (c) cell groups in the compartments, (d) a plate connector strap on each cell group, and (e) upstanding lead or lead alloy lugs on the connector straps with the lugs facing each other on each side of the apertures, the lugs being thicker than a said partition and having face portions on their face sides adapted to fully engage the immediate surface areas of the partitions around the apertures and joint-forming portions circumscribed by said face portions and adapted by fusion to link one lug to the other through the apertures, said method comprising the steps of:

positioning the cell groups with their associated straps in the compartments so that the lugs of the straps overlay the apertures of the partitions with the face portions adjacent the immediate surface area around the apertures;

positioning tool means on the back sides of the lugs, the tool means for each lug including a clamp portion, a bore in the clamp portion and a conductive plunger movable in the bore, the bores and plungers for opposing lugs being aligned with a substantial area of their associated aperture;

actuating the tool means to cause the clamp portions to engage the lugs with a sufficient clamping force to seal off the apertures with the face portions of the lugs, the joint-forming portions being spaced from each other midway through the apertures and with the partitions defining apertures which are substantially free of lug material; while maintaining the clamping force, squeezing the plungers with sufficient plunger pressure to cause the plungers to sink into the back sides of the lugs to a depth less than their thickness and short of the mouths of the apertures to extrude lead or lead alloy from the joint-forming portions of the lugs into the apertures to bridge the space therein and make contact between the lug extrusions approximately midway through the apertures;

while maintaining the pressure on the plungers and the force on the clamp portions, passing electrical current through the plungers and lug extrusions to fuse the lead or lead alloy in the apertures and to extrude more of the lugs into the apertures until voids therein fill completely with only fused lead or lead alloy which is forced out of the lugs, and, at the same time, seal against the leakage of fused lead or lead alloy from the apertures by the forcible engagement of the face portions of the lugs with the immediate surface areas around the apertures;

deenergizing the electrical current while continuing to maintain the clamping force and plunger pressure to keep the apertures filled during the solidification and cooling of the fused lead or lead alloy in the apertures into weld nuggets, whereby the cell groups are electrically joined by the lugs by liquid-tight, through-the-partition connections that were formed by the solidification of the weld nuggets under pressure.

4,046,063

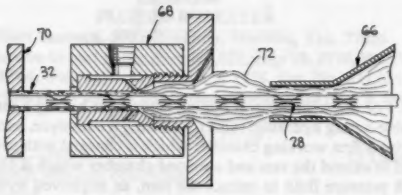
METHOD AND APPARATUS FOR MAKING TOBACCO SMOKE FILTER

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Division of Ser. No. 629,663, Nov. 6, 1975, Pat. No. 4,022,222. This application Dec. 2, 1976, Ser. No. 746,679

Int. Cl.[2] A24C 5/50

U.S. Cl. 93—1 C **8 Claims**



1. A method of making smoke filters comprising the steps of:

a. providing a first filtering material including a multiplicity of fibrous members;

b. defining a first elongated annular bonding zone;

c. continuously passing said first filtering material through said first bonding zone and during passage of said first filtering material through said first bonding zone contacting same with a bond activating agent to bond said fibrous members of said first filtering material to each other at spaced contact points thereby forming an elongated, smoke-permeable, inner member defining a tortuous path for passage of smoke therethrough;

d. forming axially spaced sections extending across the interior of said inner member which offer at least as much resistance to passage of smoke as the material of said inner member to thereby form a multiplicity of axially spaced, discrete, inner cavity means within said inner member;

e. providing a second filtering material including a multiplicity of fibrous elements;

f. continuously passing said inner member through a second elongated bonding zone and defining an annular space around said inner member in said second bonding zone;

g. continuously passing said second filtering material into and through said annular space in said second bonding zone and, intermediate the passage of said second filtering material through said second bonding zone, contacting same with a bond activating agent to bond said fibrous members of said second filtering material to each other at spaced contact points thereby forming an elongated, smoke-permeable, intermediate member defining a tortuous path for passage of smoke therethrough surrounding said inner member;

h. overwrapping said intermediate member with an overwrapping material so as to juxtapose portions of the inner surface of said overwrapped material with the exterior surface of said intermediate member to form sealed area precluding passage of smoke thereacross; and transversely severing the resulting product at selected locations to form filter elements.

4,046,064

FILTER ROD MAKING MACHINE

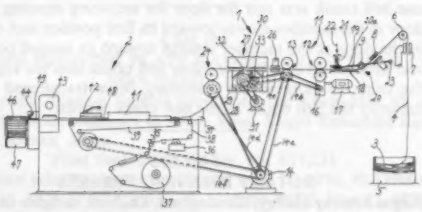
Günter Wahle, Reinbek, Germany, assignor to Hauni-Werke Körber & Co. KG, Hamburg, Germany

Filed May 4, 1976, Ser. No. 683,050

Claims priority, application Germany, May 14, 1975, 2521391; June 28, 1975, 2528906

Int. Cl.[2] A24C *5/50*

U.S. Cl. 93—1 C 13 Claims



1. In a filter rod making machine wherein a continuous tow of randomly crimped filamentary filter material is transported from a source of supply along a predetermined path toward and into a filter rod making unit, a tow stretching device comprising two pairs of rotary members driven at different speeds arranged to draw the tow from said source and to simultaneously stretch said tow; and a tow braking device adjacent to said path intermediate said rotary members and said source, said braking device including a first guide adjacent to one side of said path and a second guide adjacent to the other side of said path opposite said first guide and arranged to yieldably urge the tow against said first guide with a substantially constant force so as to furnish a substantially constant braking action for each increment of the tow passing between said guides.

4,046,065

RECTANGULAR AND FLAT BOTTOM BAG AND METHOD OF MANUFACTURE

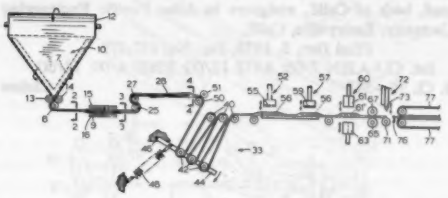
Gary G. Plate, 635 Vickers Court, Burlington, Canada

Filed Sept. 16, 1976, Ser. No. 723,699

Claims priority, application Canada, Aug. 11, 1976, 258890

Int. Cl.[2] B31B *49/04*

U.S. Cl. 93—35 SB 4 Claims



1. A method of manufacturing a rectangular, flat bottom bag from heat sealable plastics sheet material which comprises: folding said sheet material longitudinally to define a pair of opposed side walls about a fold line, forming a gusset along said fold line having a pair of opposed gusset folds, turning one of said gusset folds upon an adjacent side wall whereby said gusset folds together form an outer planar bottom panel and an inner gusset fold opposed to the adjacent side wall defining an inner fold line, separating the inner gusset fold from the adjacent side wall and transversely heat sealing the sheet material forming the planar bottom panel by an X-weld at an acute angle to the inner fold line of the sheet material, whereby the centre of the X-weld intersects the said inner fold line, severing and removing from said sheet material lateral triangular corner portions defined by said X-weld, and transversely welding and severing said stock material along a line intersecting the centre of said X-weld.

4,046,066

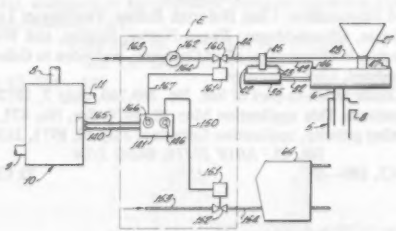
CONTINUOUS FLOW EXPANDER FOR EXPANDING PARTICULATE MATERIAL

Michael J. Wood, Westminster, Calif., assignor to J. P. Burroughs & Son, Inc., Saginaw, Mich.

Filed May 24, 1974, Ser. No. 472,977

Int. Cl.[2] A23L *1/18*; A23B *4/04*

U.S. Cl. 99—323.7 31 Claims



1. An expander for particulate fodder, comprising:

a. a pressurized region in which particulate fodder is pressurized prior to expansion into puffed form,

b. injection means for introducing particulate fodder into said pressurized region while substantial pressure is maintained in said pressurized region, whereby processing of particulate fodder previously introduced may be continued during the introduction of additional particulate fodder,

c. a restrictive opening through which the pressurized particulate fodder is ejected into a region of pressure lower than that of said pressurized region for expansion into puffed form,

d. transport means for moving pressurized fodder through said pressurized region to said restrictive opening, and

e. means for maintaining enthalpy at said restrictive opening within a predetermined range.

4,046,067

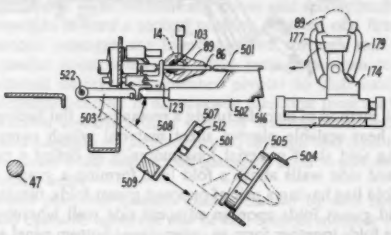
MACHINE FOR CUTTING PEARS INTO SEGMENTS

Malcolm W. Loveland, Orinda, and Rudolph Matthews, Oakland, both of Calif., assignors to Atlas Pacific Engineering Company, Emeryville, Calif.

Filed Dec. 3, 1975, Ser. No. 637,379

Int. Cl.[2] A23N *7/08*; A47J *17/00*; B26D *4/00, 11/00*

U.S. Cl. 99—543 **7 Claims**



1. In a machine wherein a pear is impaled upon a first spindle which serves as a support for the pear during peeling and coring of the pear, a second spindle for receiving a cored and peeled pear from said first spindle, said second spindle being mounted for movement into a first position in which the second spindle is in axial alignment with the first spindle, pushing means for pushing a pear off the first spindle onto the aligned second spindle, a normally stationary circular knife having a plurality of radial knife blades for cutting the pear into segments, said knife spaced from the axis of said first spindle, means for moving the second spindle to a second position in which the second spindle is in alignment with said circular knife, and means for pushing the pear along the second spindle through the circular knife to cut the pear into segments.

4,046,068

APPARATUS FOR FORMING MATS OR STRANDS OF FODDER FEED MATERIAL FOR FLAT STORAGE THEREOF

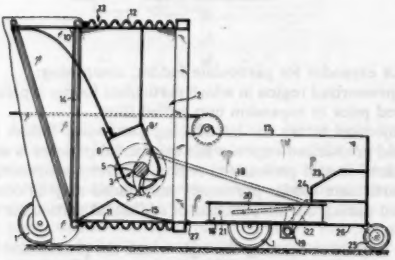
Alfred Eggenmüller, Ulm; Heinrich Bellan, Thalfingen; Lorenz Scherer, Oberelchingen; Eugen Notter, Senden, and Werner Wagler, Wullenstetten, all of Germany, assignors to Gebruder Eberhard, Ulm, Germany

Continuation-in-part of Ser. No. 269,760, July 7, 1972, abandoned. This application May 20, 1974, Ser. No. 471,278

Claims priority, application Germany, July 10, 1971, 2134578

Int. Cl.[2] A01F *25/16*; B65G *3/04*

U.S. Cl. 100—65 **22 Claims**



1. Apparatus for forming a continuous strand or mat of agricultural feed stock for storage thereof in flat layers, said apparatus including an undercarriage, a movable molding channel mounted to said undercarriage, compression means arranged in said molding channel comprising a roller extending almost across the full width of said channel, a plurality of teeth secured circumferentially on said roller along the length thereof, a stripping basket arranged in the lower part of said channel and operatively associated with said roller, upper and lower guide plate means mounted in said channel for guiding said feed stock which is pressed by said roller towards a stationary wall, said teeth being arranged along helical lines on the press roller, and the roller being supported within said stripping basket.

4,046,069

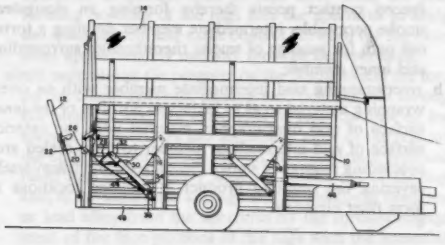
MEANS FOR CONTROLLING DISCHARGE DOOR MOVEMENT

Glenn Dale Head, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.

Continuation of Ser. No. 496,540, Aug. 12, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,483

Int. Cl.[2] A01D *90/08*

U.S. Cl. 100—255 **11 Claims**



1. In an agricultural machine having a mobile frame, a crop-receiving container on the frame and including a discharge opening, a door hinged at its lower portion to the container and movable between open and closed positions as respects said opening; the improvement residing in means for controlling movement of the door between its open and closed position, comprising: a swingable bell crank having a pair of arms carried by the container for movement between first and second positions; a guide carried by the container above the door hinge; a cable trained over the guide and connected between one bell crank arm and the door for incurring opening of the door as the member moves toward its first position and closing of the door as the member returns toward its second position; and means movable by the other bell crank arm for engaging the cable to increase the tensioning force transferred to the cable by the bell crank as the bell crank moves.

4,046,070

ROTARY PRINTING PRESSES

Angus Murray Halley, Birmingham, England, assignor to James Halley & Sons Limited, West Bromwich, England

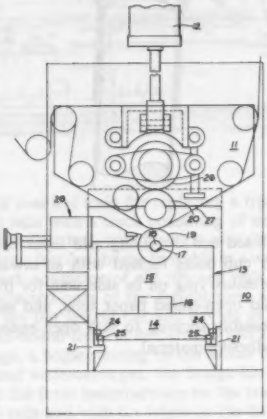
Continuation of Ser. No. 462,766, April 22, 1974, abandoned. This application Sept. 16, 1975, Ser. No. 613,751

Int. Cl.[2] B47F *9/15*

U.S. Cl. 101—216 **2 Claims**

1. A rotary printing press having a frame and an image cylinder positioned on said frame in an operative position aligned directly below an impression cylinder, said impression cylinder being so mounted on the frame as to be selectively movable between a non-functioning position spaced above said image cylinder and an operative position where it cooperates with the operatively positioned image cylinder for forming a nip through which material to be printed may be fed, said press including a mounting cradle for said image cylinder comprising an elongate horizontal beam and a pair of upstanding supports on the beam, at least one of said supports being movable

longitudinally of said beam for adjustment of the relative spacing of said supports and each support having bearing means rotatably mounting a respective end of the image cylinder; opposed horizontal slide means on said frame and extending transversely thereof on which said cradle is supported and along which said cradle is selectively movable in a direction parallel to the axis of rotation of the image cylinder for insertion into said frame for operatively positioning the image cylinder mounted thereon and for removal from said frame; locator means on opposite sides of the cradle adapted for engagement with and movement along substantially vertical



longitudinal formations of the slide means to positively locate the cradle laterally of the slide means; and clamping means for releasable endwise connection of the cradle to the frame to positively maintain the cradle longitudinally of the slide means in the operative position of said image cylinder, said slide means comprising horizontally spaced rails along which the cradle is movable, said substantially vertical longitudinal formations being upright flanges on said rails, said locator means comprising rotatable side rollers on the cradle peripherally engaging said flanges, and at least some of said side rollers being eccentrically mounted for selectively adjustable positive location of the cradle laterally of the rails.

4,046,071

RELIEF PRINTING PLATE HAVING PROJECTIONS IN NON-IMAGE AREAS

Masayoshi Mizuno; Tadashi Kawamoto, and Kiichi Iida, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sept. 26, 1975, Ser. No. 617,131

Claims priority, application Japan, Sept. 26, 1974, 49-110001; Mar. 31, 1975, 50-37775; Apr. 28, 1975, 50-50775; May 22, 1975, 50-60167; Sept. 5, 1975, 50-107056

Int. Cl.² B41N *1/00*; G03C *5/00*

U.S. Cl. 101—395 **7 Claims**

1. A printing plate comprising a support, reliefs comprising photocured photosensitive resin formed thereon as an image area and from about 20 to about 4,000/cm² small projections thereon in non-image areas, the height of the reliefs being at least 0.5 mm larger than that of the small projections, the top of each small projection having an area of not more than 0.04 mm², and the summation of the areas of the tops of the small projections being not more than 30% of the area of the support, the diameter of the top surface of each of the small projections being not more than 0.25 mm and the diagonal length of the top surface of each of the small projections being not more than 0.25 mm.

4,046,072

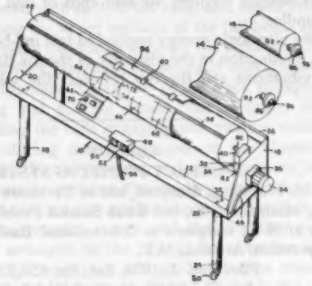
PRINTING DIE ROTARY GLUING TABLE

Joseph E. Henderson, 5422 Spahn Ave., Lakewood, Calif. 90713

Filed Dec. 30, 1976, Ser. No. 755,801

Int. Cl.² B41F *27/12, 27/14*

U.S. Cl. 101—415.1 **4 Claims**



1. A work support useful for gluing flexible printing dies to a flexible sheet backing which comprises:

an elongated frame having opposite, upright end plates;

a plurality of interchangeable, elongated cylindrical work-support members with coaxial end shafts projecting from each end thereof and a longitudinal channel to receive the reverse lip of a flexible sheet material;

end shaft bearing means to mount on each of said end shafts;

cylindrical member support means comprising a pair of V-disposed bracket means on the inboard faces of each of said end plates to receive said end shaft bearing means;

driven gear means on one of said end shafts;

drive means mounted on said frame and having driving gear means carried on one of said end plates to mesh with said driven gear means.

4,046,073

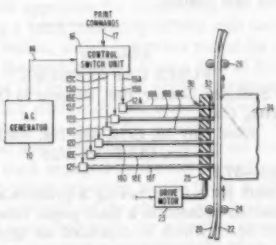
ULTRASONIC TRANSFER PRINTING WITH MULTI-COPY, COLOR AND LOW AUDIBLE NOISE CAPABILITY

Joan LaVerne Mitchell, Peekskill; Keith Samuel Pennington, Somers, both of N.Y., and Frederick Hochberg, deceased, late of Yorktown Heights, N.Y. (by Lee Hochberg, administratrix), assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1976, Ser. No. 653,169

Int. Cl.² B41J *3/20*; G01D *9/00*

U.S. Cl. 101—426 **29 Claims**



1. An ink printing system, comprising:

ultrasonic energy generating means;

an ink-bearing medium having a back surface through which ink can be transferred upon reduction of the ink viscosity;

means for providing a paper to be printed on in contact with the back surface of said ink-bearing medium;

sonic transmission means connected to said ultrasonic energy generating means for transferring sonic energy to said ink-bearing medium, said sonic transmission means including a plurality of sonic wires or bundles having their downstream ends adapted to contact said ink-bearing medium; and

modulation means for selectively coupling the sonic energy from said ultrasonic energy generating means to said ink-bearing medium via said ends of said sonic wires or bundles;

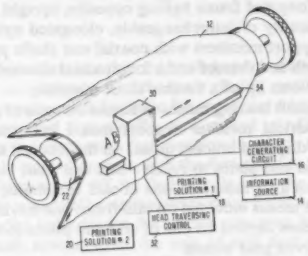
whereby ultrasonic energy applied to said ink-bearing medium causes a reduction in the viscosity of the ink due to the ultrasonic vibrations and thereby transfers the ink to said print paper.

4,046,074

NON-IMPACT PRINTING SYSTEM

Frederick Hochberg, deceased, late of Yorktown (by Lee Hochberg, administratrix), and Keith Samuel Pennington, Somers, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,322
Int. Cl.[2] G01D *15/18*; B41M *5/20*
U.S. Cl. 101—426 **16 Claims**



1. A non-impact recording process including the forming of an energy sensitive surface on a support medium in real time with respect to said recording operation, from a plurality of materials which will produce a visible mark on said surface in response to the impingement of an external energy sources thereon, said process comprising:

forming at least two solutions from said materials with suitable solvents,

forming said solutions into a finely divided mist,

directing said mist onto the surface of said support medium with sufficient velocity to wet same and to form a composite uniform coating thereon, and

selectively exposing said coating to said external energy source to form visible images thereon immediately after forming said coating.

4,046,075

FUSEE CAP CLOSURE

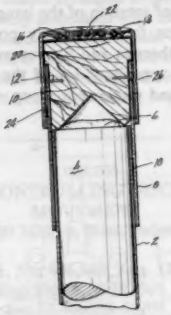
Perry Kay Spangler, Denver, Ind., assignor to Olin Corporation, New Haven, Conn.

Filed July 26, 1976, Ser. No. 708,827
Int. Cl.[2] F42B *4/26*
U.S. Cl. 102—37.8 **1 Claim**

1. A closure for a fusee having a cylindrical mass of pyrotechnic material encased in a main paper tube and having an end surface upon which is deposited an ignition coating of primer material, said closure comprising:

a. an open-ended paper tube telescoped over said main paper tube and extending beyond said primer-coated end surface of said pyrotechnic material, said open-ended paper tube containing a wooden insert which is secured to said open-ended paper tube and which overlies said primer-coated end surface of said pyrotechnic material, an outer end surface of said wooden insert being coated with a layer of scratch mix, and said open-ended paper tube being releasably secured to said main paper tube with an adhesive material; and

b. a paper cup having a spun-in closed end, said cup being telescoped over said open-ended paper tube with said



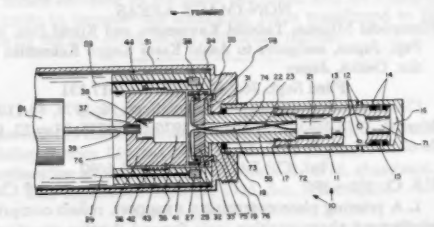
spun-in closed end overlying said layer of scratch mix, said paper cup being formed with an inwardly crimped annular pressure ring on its side wall for frictionally engaging said open-ended paper tube, and said paper cup being releasably secured to said open-ended paper tube with an adhesive material.

4,046,076

IMPULSIVE ROCKET MOTOR SAFETY-ARMING DEVICE

Thomas W. Hampton, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 29, 1975, Ser. No. 617,568
Int. Cl.[2] F42C *19/08*
U.S. Cl. 102—70.2 A **16 Claims**



12. An impulsive safety-arming device for enabling safe storage and handling as well as for providing reliable ignition of a rocket motor, comprising:

a gas generator;

a container surrounding said gas generator for containing gas produced by said gas generator; and

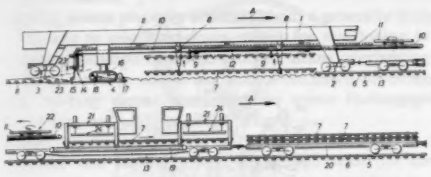
condition responsive means associated with said container for causing said container to fail to contain said gas in response to predetermined conditions.

4,046,077

TRACK RENEWAL METHOD AND APPARATUS

Josef Theurer, Vienna, and Manfred Brunninger, Linz, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed July 2, 1976, Ser. No. 702,031
Claims priority, application Australia, July 11, 1975, 5389/75
Int. Cl.[2] E01B 29/02
U.S. Cl. 104—2 6 Claims



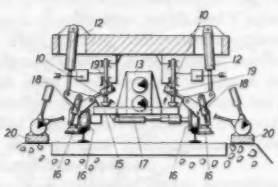
2. A track renewal train for replacing a track consisting of old ties and rails with a track consisting of new ties and rails resting on a ballast bed, comprising a plurality of rail freight cars including a last freight car movable in a working direction over the track consisting of old ties and rails, new ties being stored on selected ones of the freight cars, a bridge-like car coupled to the last freight car and having at respective ends thereof a rail-bound front undercarriage and a rail-bound rear undercarriage, a bogie running on the ballast bed intermediate the rail-bound undercarriages, the bridge-like car being supported with the front undercarriage on the track consisting of old ties and rails and with the bogie on the ballast bed, means on the bridge-like car between the bogie and the front undercarriage for lifting a section of track consisting of old ties and rails off the ballast bed, means for transporting the lifted track section in the working direction from the bridge-like car to a selected one of the freight cars, an endless conveyor means mounted on the bridge-like car above the track section transporting means for conveying a succession of stored new ties against the working direction, the endless conveyor means having a front end projecting forwardly of the bridge-like car over the last freight car and a rear end extending to a region between the bogie and the rear undercarriage, means mounted in said region on the bridge-like car for lowering the conveyed new ties successively onto the ballast bed in selected spacing, and means for planing the ballast bed before the new ties are laid.

4,046,078

TRACK SURFACING APPARATUS

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Continuation-in-part of Ser. No. 644,638, Dec. 29, 1975. This application Jan. 26, 1976, Ser. No. 652,475
Claims priority, application Austria, Jan. 31, 1975, 738/75; Mar. 5, 1975, 1716/75
Int. Cl.[2] E01B 27/17, 29/04
U.S. Cl. 104—7 R 10 Claims



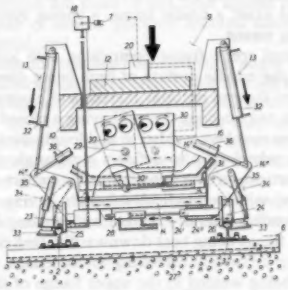
1. In a mobile apparatus for compacting ballast of a ballast bed supporting a track consisting of two rails fastened to ties resting on the ballast, each rail having a rail head with an upper surface and a side face, the apparatus comprising means for determining a deviation of the track position from a desired level: at least two track stabilization units spaced from each other in the direction of track elongation, each unit including a chassis mounted for mobility on the track on two undercarriages spaced from each other in the direction of track elongation, each undercarriage having rail engaging and guiding means associated with each of the rails, said means comprising rollers engaging the upper surfaces of the rail heads and guide elements engaging the side faces of the rail heads and cooperating with the rollers, means for imparting at least approximately horizontal vibrations to a section of the track engaged by the rail engaging and guiding means, the vibration imparting means including the rails engaging and guiding means and a vibration producing means arranged on the chassis, means associated with the rail engaging and guiding means for simultaneously laterally pressing the guiding elements associated with each rail without play against the rail with which they are associated, the pressing means and the vibration producing means being arranged on the chassis for vibration in unison whereby the rail engaging and guiding means transmit the vibration to the track section, and load means in the region of the vibration imparting means for imparting a pressure to both rails of the track in the direction of the ballast bed whereby the track is pressed to a lower level.

4,046,079

TRACK SURFACING APPARATUS

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Dec. 29, 1975, Ser. No. 644,638
Claims priority, application Austria, Jan. 31, 1975, 738/75
Int. Cl.[2] E01B 27/17
U.S. Cl. 104—7 R 22 Claims



1. In a mobile apparatus for compacting ballast of a ballast bed supporting a track consisting of two rails fastened to ties resting on the ballast, which comprises means for determining a deviation of the track position from a desired level, a chassis having a pair of rail engaging and guiding means spaced in the direction of track elongation and associated with each of the rails and mounting the chassis for mobility on the track, means for imparting at least approximately horizontal vibrations to a section of the track engaged by the rail engaging and guiding means, the vibration imparting means being a vibration producing means arranged on the chassis, and load means in the region of, and associated with, the vibration imparting means for imparting a pressure to both rails of the track in the direction of the ballast bed whereby the track is pressed to a lower level while being vibrated, the improvement of the vibration imparting and load means being associated with the rail engaging and guiding means for simultaneously laterally vibrating and vertically loading each of the rail engaging and guiding means, and further comprising means for pressing the rail engaging and guiding means associated with each rail without play with respect to the chassis and against the rail with which

it is associated, the load and the vibration producing means being arranged on the chassis to load and vibrate the rail engaging and guiding means in unison whereby the rail engaging and guiding means transmit the vibration and load to the track section.

4,046,080

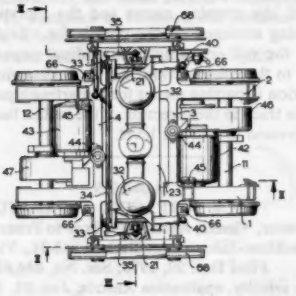
MOTORIZED SWIVELING STREETCAR TRUCKS

Hans Dieling, Rhunda, and Manfred Schindehutte, Calden, both of Germany, assignors to Wegmann & Co., Kassel, Germany

Continuation-in-part of Ser. No. 496,243, Aug. 9, 1974, abandoned, which is a continuation of Ser. No. 368,379, June 8, 1973, Pat. No. 3,830,166. This application Mar. 18, 1975, Ser. No. 559,456

Int. Cl.² B61C *3/00, 15/00;* **B61F** *3/04, 5/24*

U.S. Cl. 105—133 **8 Claims**



1. A motor powered swivel truck for rail vehicles, especially for streetcars, comprising a welded swivel truck frame having a pair of wheel axles, a cradle frame, a spring system and a sway stabilizing means

A. Said swivel truck frame comprising two longitudinal members, the middle portion of each being disposed at a level below the end portions thereof and having an open profile, the end portions thereof having a closed profile, a pair of cross members welded to said longitudinal member within the wheel axles to define a quadrangle where the middle portions of the longitudinal members have the lower leve, said longitudinal members having an upper flange extending laterally thereof and running longitudinally, said flange being bent downwardly, said cross members having a laterally extending lower flange, said cross members being welded to the upper flange of the middle portion of said longitudinal members within said quadrangle through a stiffening sheet, said stiffening sheet being welded to said upper and lower flanges;

B. The end portions of said longitudinal members having recesses for receiving wheel bearings;

C. Said spring system disposed between said swivel truck frame and said cradle frame and comprising a pair of coil springs, one on each side of said truck;

D. Said sway stabilizing means comprising a torsion rod disposed rotatably at said cradle frame transversely of the direction of travel of said truck, the ends of which are connected to horizontally disposed levers rigidly mounted, said horizontally disposed levers each having a free end, said free ends each connected to a vertical member, said vertical member connected to said swivel truck frame;

E. Said cradle frame comprising a central receiver for receiving a connector attached to a car body, a pair of electric motors having output shafts, said motor disposed on said cradle such that said output shafts are parallel to the wheel axles, the housings for said motor suspended on one side on a longitudinal member.

4,046,081

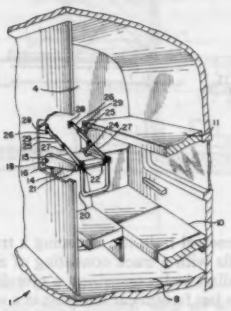
HEADREST LADDER

Jack E. Gutridge, Dyer; Keith J. Hallam, Merrillville, and Ronald W. Marsh, Michigan City, all of Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed Aug. 23, 1976, Ser. No. 716,728

Int. Cl.² B61D *1/08, 31/00*

U.S. Cl. 105—326 **5 Claims**



1. A sleeping compartment in a passenger vehicle including an outer wall, longitudinally spaced laterally partition walls, an upper bed connected to one of said walls for movement from a stored to a horizontal position, a passenger seat proximate to said bed, and an improved headrest associated with said seat adapted to selectively provide a seat headrest and passenger access ladder and step,

said headrest having upper and lower edge portions and a rigid back portion,

hinge means pivotally coupling said lower edge portion to an associated wall to accommodate movement of the headrest from a generally vertical position to an essentially horizontal load supporting position,

upper support means coupling said upper edge portion and said associated wall in load supporting relation, and

a ladder having an inner end section pivotally coupled to said upper edge portion and an outer end section movable thereabout; whereby,

when the headrest is in the vertical position the ladder is stowably interposed between the back portion and the associated wall, and when the headrest is in the horizontal position the ladder depends vertically therefrom.

4,046,082

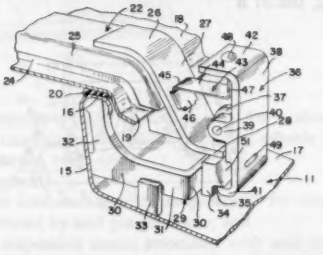
TROUGH HATCH LOCKING DEVICE

George A. Tedesco, and Marvin Stark, both of Michigan City, Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed July 14, 1975, Ser. No. 595,818

Int. Cl.² B61D *39/00*

U.S. Cl. 105—377 **9 Claims**



1. A locking device for use in a railway hopper car having a

roof with a hatch opening defined by an upstanding coaming, the improvement comprising:

hatch cover means movable to an open position at one side of the opening and to a closed position over the opening;

resilient means interposed between the coaming and the hatch cover means for biasing the hatch cover means upwardly in the closed position thereof;

hold-down means adapted to move pivotally between locked and unlocked positions with respect to said hatch cover means;

locking means pivotally attached about a generally horizontal axis to said hold-down means for positioning in the locked position of the hold-down means overlapping the hatch cover means at one side of the hatch cover means;

said locking means comprising an upper footengageable portion, and a lower keeper finger;

keeper lug means mounted on the roof beneath said locking means and having means engageable with the keeper finger to secure the hold-down means attendant to said hold-down means being positioned in locking position;

said keeper finger adapted to be disposed beneath said keeper lug means and said resilient means biasing said lug means and keeper finger into engaged position; and

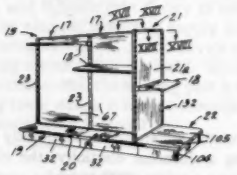
said locking means being movable downwardly with said hold-down means upon said foot portion being depressed against the resistance of said resilient means to release said finger from said keeper lug.

4,046,083

MERCHANDISE DISPLAY SHELVING ASSEMBLY

Robert N. Murdoch, Palatine; Vincent M. Travaglio, Rolling Meadows, and Michael L. Magnifico, Chicago, all of Ill., assignors to Emhart Corporation, Farmington, Conn.

Filed Apr. 5, 1976, Ser. No. 673,694
Int. Cl.² A47B *9/00*
U.S. Cl. 108—107 **45 Claims**



1. A merchandise display shelving assembly, comprising:

base means;

upright shelf-carrying structure supported by said base means and including spaced hollow vertical posts each having at least one vertically elongated flat face panel bar providing a shelf-supporting face for the post, said bar being of substantial thickness and having vertical opposite side edges of substantial width and a series of vertically spaced shelf bracket connection apertures intermediate said edges, a pair of substantially coextensive vertical opposite sides of relatively thin gauge material having body portions engaged with said panel bar along said side edges and spaced apart by the width of said panel bar, and means securing said side edges in edgewise abutment against said body portions;

connecting and stabilizing means extending between said posts;

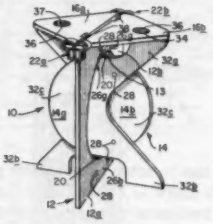
and means on at least one of said side body portions of each post for attaching said connecting and stabilizing means to and between the posts.

4,046,084

FOLDING STOOL AND TABLE

Charles D. Hosford, and Barry Simpson, both of Dirt Road Rural Delivery 1, Box 122, Waitsfield, Vt. 05673

Filed Feb. 22, 1977, Ser. No. 770,707
Int. Cl.² A47B *3/00*; F16M *11/38*
U.S. Cl. 108—112 **11 Claims**



1. An article of folding furniture comprising

A. a first upstanding leg structure made of rigid sheet material and having parallel top and bottom edges,

B. means defining a central opening in the first structure,

C. a second upstanding leg structure made of rigid sheet material and with parallel top and bottom edges, said second structure being positioned in said opening with the vertical axes of the two leg structures coinciding and with opposite side edges of the second structure being disposed on opposite sides of the first structure,

D. means for pivotally connecting the two structures at their vertical axes so that the two structures are pivotable relative to one another about said axes from an open position wherein the two leg structures are disposed at right angles to one another to a closed position wherein the two leg structures are more or less flush against one another,

E. a pair of similar platform sections made of rigid sheet material, and

F. means for hinging corresponding edges of the platform sections to the upper edge of the first leg structure so that the platform sections are swingable from an open, generally horizontal position wherein they are engaged and supported by edges of the second leg structure to a folded position wherein they are disposed flush against one another directly above the leg structures when said structures are in their folded position whereby the leg structures and platform sections form a relatively flat, compact package.

4,046,085

METHOD AND APPARATUS FOR TREATING WASTE MATERIAL IN A COUNTER-CURRENT INCINERATOR

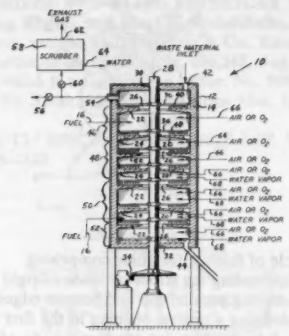
Louis T. Barry, Skillman, and Gordon W. Czop, Garfield, both of N.J., assignors to Nichols Engineering & Research Corporation, Belle Mead, N.J.

Filed July 19, 1976, Ser. No. 706,616
Int. Cl.² F23G *5/04*
U.S. Cl. 110—12 **8 Claims**

1. A method of treating waste material in a counter-flow furnace wherein the waste material to be treated is introduced at one end thereof and the treated material is discharged from the other end thereof, while simultaneously the gases of combustion are caused to flow in counter-current direction with respect to the material being processed and are exhausted at said one end of the furnace, and wherein the furnace has a natural tendency to form zones of processing including sequentially from said one end of the furnace, a drying zone, a charring and volatile burning zone, a fixed carbon burning zone, and an ash cooling zone, said method further comprising the step of adding an oxidant including water vaor to the fixed carbon burning zone.

8. Apparatus for treating waste material comprising, in com-

bination, a multiple hearth furnace having a plurality of vertically spaced hearths, a rotatable center shaft extending through the center of the furanace and passing through each hearth, a plurality of spaced rabble arms secured to the center shaft and extending radially outwardly over each hearth, alternate hearths having drop holes disposed towards the center shaft and the other hearths having drop holes disposed toward the outer periphery thereof, said furanace having an upper



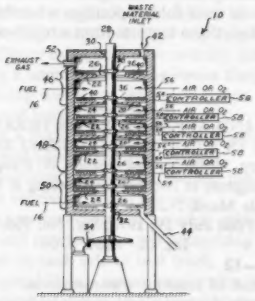
material inlet and a lower material dispensing outlet, and said furnace having an upper exhaust gas outlet, said furnace having a natural tendency to form zones of processing including sequentially from the top thereof to the bottom, a drying zone, a charring and volatile burning zone, a fixed carbon burning zone and an ash cooling zone, and means for adding an oxidant including air and water vapor to the fixed carbon burning zone.

4,046,086

TREATMENT OF WASTE MATERIAL CONTAINING ALKALI METALS IN A CONTROLLED ATMOSPHERE FURNACE

Charles F. von Dreusche, Jr., Ramsey, N.J., assignor to Nichols Engineering & Research Corporation, Belle Mead, N.J.

Filed July 19, 1976, Ser. No. 706,638
Int. Cl.[2] F23G *5/04*
U.S. Cl. 110—12 **10 Claims**



1. A method of treating waste material containing alkali metals in a counter-flow furnace wherein waste material to be processed is introduced at one end thereof and the processed material is discharged from the other end thereof, while simultaneously air is introduced and the gases of combustion are caused to flow in counter-current direction with respect to the material being processed and are exhausted at said one end of the furnace, and wherein the furnace has a natural tendency to form zones of processing including sequentially from said one end of the furnace, a drying zone, a charring and volatile burning zone, and a fixed carbon burning zone, said method further comprising the step of maintaining a maximum temperature in the furnace below about 1400° F. directly adjacent the surface of the bed of material being processed.

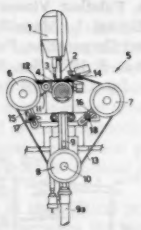
9. Apparatus for treating waste material containing alkali metals comprising, in combination, a multiple hearth furnace having a plurality of vertically spaced hearths, a rotatable center shaft extending through the center of the furnace and passing through each hearth, a plurality of spaced rabble arms secured to the center shaft and extending radially outwardly over each hearth, alternate hearths having drop holes disposed towards the center shaft and the other hearths having drop holes disposed toward the outer periphery thereof, said furnace having an upper material inlet and a lower material dispensing outlet, and said furnace having an upper exhaust gas outlet, means disposed on successive hearths in said furnace for ascertaining the temperature at each hearth and means for maintaining a maximum temperature on that hearth below about 1400° F.

4,046,087

AUTOMATIC APPARATUS FOR CONJOINTLY SEWING TWO ELASTIC CLOTHS HAVING DIFFERENT ELASTICITY

Orlando Manetti, Valdobbiadene, Italy, assignor to Sigismondo Piva S.p.A., Milan, Italy

Filed Apr. 7, 1975, Ser. No. 565,948
Int. Cl.[2] D05B *21/00*
U.S. Cl. 112—121.15 **10 Claims**



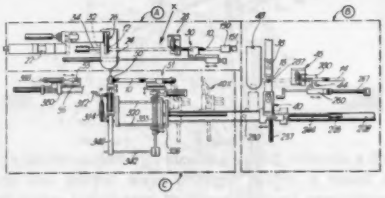
1. An automatic apparatus for conjointly sewing two elastic cloths having a different elasticity, the cloth with a lower elasticity having a substantially annular contour, the sewing of said cloths occurring through a sewing cycle defined by substantially 360° of said annular cloth of lower elasticity, said apparatus comprising a sewing machine having a working table and a rotating member, said sewing machine having a sewing area including a sewing needle, said apparatus further comprising supporting and feeding means for the cloths to be joined on the working table of the sewing machine, said supporting and feeding means comprising a plurality of pulleys, one of which is connected to said rotating member of the sewing machine, said pulleys each having a conical portion and a cylindrical portion operable to support said cloths in overlapping position to be sewn and being positioned in a plane which is perpendicular to the working table of the sewing machine, the axis of one of the pulleys not connected to the rotating member of the sewing machine being defined by a shaft adjustable in its position relative to the other pulleys whereby the center distance between said one pulley and the other pulleys is adjustable, said shaft being fastenable in any of its positions; positioning means for positioning said cloth within the sewing area; and discharging means for automatically discharging the finished pieces formed by the two joined cloths.

4,046,088

APPARATUS FOR SEWING RINGS, BUCKLES AND THE LIKE ELEMENTS ONTO TAPE

John R. Asel, Lorraine; Roger Allaire, St. Leonard; Peter Thalmann, Lachine, and Réne Castonguay, Montreal, all of Canada, assignors to Canadian Lady-Canadelle Inc., W. Montreal, Canada

Filed Apr. 22, 1976, Ser. No. 679,425
Claims priority, application United Kingdom, May 14, 1975, 20441/75
Int. Cl.² D05B 3/12
U.S. Cl. 112—265 15 Claims



1. A device for holding an element such as a ring, buckle, or the like while said element is being sewn onto a tape by a sewing machine equipped with a sewing foot and bed capable of moving a tape clamped therebetween through a predetermined path to sew a non-linear seam across the tape, said device comprising a main body part and a holding part, said holding part having clamping means for said element, said body part being movable to suitably position said holding part firstly in a receiving position to receive said element from a supply source and secondly in a sewing position in which said element is disposed adjacent said foot and bed of the sewing machine and so positioned that after threading of said tape through said element parts of said tape adjacent said element may be clamped between said foot and said bed for sewing, and said holding part and said body part having inter-engaging sliding surfaces for movement of said holding part relative to the body part in a plane parallel to those parts of the tape clamped by said foot and bed when the body part is in said sewing position, said body part including releasable locking means for locking said holding part firmly in said body part during transfer of an element from said supply source to said holding part and during movement of said device to the sewing position, said locking means being releasable when the device is in the sewing position so that the holding part is free to move with the tape being sewn which is moved through said predetermined path by the sewing foot and bed.

4,046,089

MACHINE FOR MAKING SHOULDER STRAPS

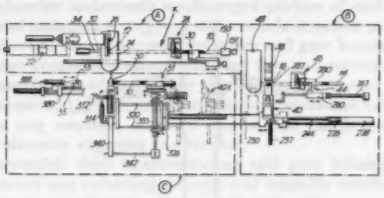
John R. Asel, Lorraine; Roger Allaire, St. Leonard; Peter Thalmann, Lachine, and Rene Castonguay, Montreal, all of Canada, assignors to Canadian Lady-Canadelle Inc., W. Montreal, Canada

Filed Apr. 22, 1976, Ser. No. 679,424
Claims priority, application United Kingdom, May 14, 1975, 20441/75
Int. Cl.² D05B 3/12
U.S. Cl. 112—265 19 Claims

1. Apparatus for forming a strap of the type having first and second strap portions united together, the first strap portion being a first tape with a free end and a buckle end with a two-slot buckle attached thereto, the second strap portion being a second tape with a ring attached to one end thereof, including means for uniting the first and second strap portions which means comprise:

a first clamping device for holding the buckle end of the first strap portion with the buckle disposed substantially perpendicular to the end part of the first strap portion adjacent said buckle,

a second clamping device having a narrow projecting end for holding the free end of the first strap portion and being suitably dimensioned for inserting this free end through the ring of the second strap portion and also into a first slot of the buckle,



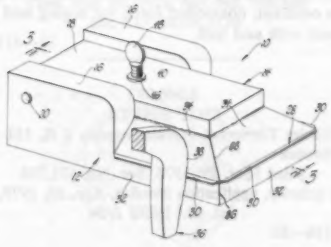
means for causing relative movement of said clamping devices between an initial position in which the free end of the first strap portion is suitably orientated for receiving the ring, and a final position in which the said free end is inserted into said first slot in said buckle.

4,046,090

APPARATUS AND METHOD FOR MAKING DECORATIVE TILES

Thomas W. Capeling, 1295 N. Wayne Road, and Robert G. Lovins, 470 Hickory Lane, both of Westland, Mich. 48185

Filed July 12, 1976, Ser. No. 704,587
Int. Cl.² B21D 53/44, 19/00
U.S. Cl. 113—1 K 8 Claims



7. A method for fabricating decorative tiles from container cans comprising: positioning a flattened can portion of a generally rectangular shape between rectangular clamping surfaces of two clamp members having respective sets of three edge surfaces one set of which is perpendicular to the associated clamping surface and the other set of which extends inwardly with respect to the perpendicular edge surfaces; moving the clamp members to a closed position to clamp the can portion between the clamping surfaces thereof with three edges of the can portion projecting outwardly from between the edge surfaces of the clamp members; and bending the three outwardly projecting can portion edges away from the inwardly extending edge surfaces toward the perpendicular edge surfaces to provide reinforcing edge flanges.

4,046,091

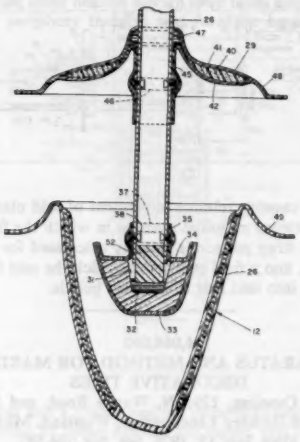
METHOD AND APPARATUS FOR SECURING PYLON AND DECK TO THE HULL OF A SAILING VESSEL

James Arthur Lomas, III, Dana Point; Ronald La Verne Lee, Anaheim, and Andrew Macdonald Holland, Capistrano, all of Calif., assignors to Coast Catamaran Corporation, Irvine, Calif.

Filed Oct. 12, 1976, Ser. No. 731,661
Int. Cl.² B63H 9/06
U.S. Cl. 114—39 5 Claims

1. In a method of securing a pylon and a deck to the hull of

a sailboat, the pylon being a hollow tubular element, the steps comprising inserting a core into said pylon so that it extends at least partially outwardly from the distal end thereof; inserting glue into a well in a pylon shoe adapted to receive said pylon; and then assembling said pylon and deck and shoe to said hull



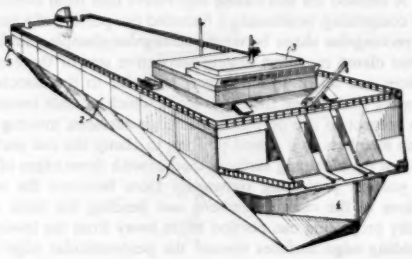
so that the glue in said well is forced by said core into the space between the sidewall of said well and the outer surface of said pylon, and said core is displaced telescopically into said pylon to exert a constant, controlled force for urging said shoe into engagement with said hull.

4,046,092

SHIP'S HULL

Bengt Wilhelm Törnqvist, Hovslagargatan 5 B, 111 48 Stockholm, Sweden

Filed Mar. 29, 1976, Ser. No. 671,735
Claims priority, application Sweden, Apr. 30, 1975, 7505103
Int. Cl.² B63B *1/04*
U.S. Cl. 114—56 **5 Claims**



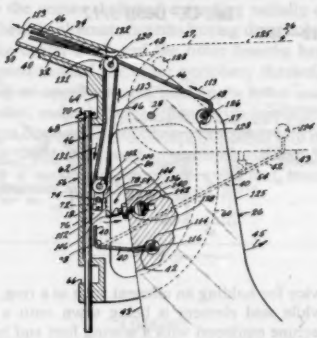
1. A displacement ship for the transport selectively of low and high density cargo comprising: a hull which is substantially uniformly trapezoidal in cross-section and extends between stem and stern of the ship, said hull having downwardly and inwardly inclined side walls forming an angle of from 35° to 55° with the horizontal; a main deck surmounting said hull and coextensive lengthwise therewith, said side walls of the hull extending upwardly above the design water line of the ship a distance at least equal to one-fourth the height of the hull and terminating at said main deck; and at least one additional cargo deck coextensive in length and width with said main deck and positioned thereabove.

4,046,093

KICKUP RUDDER APPARATUS HAVING ADJUSTABLE RAKE

Geoffrey C. Prindle, Dana Point, and J. Sterling Santley, South Laguna, both of Calif., assignors to Surfglas, Inc., Santa Ana, Calif.

Filed Feb. 17, 1976, Ser. No. 658,285
Int. Cl.² B63H *25/06*
U.S. Cl. 114—165 **5 Claims**



1. In a kickup rudder apparatus including a rudder, the improvement comprises:

means for adjusting the rake of said rudder including a spring-loaded detent engageable by an adjustable lock, said detent including a rod slidably mounted in a slot and springs biasing said rod to one end of said slot, said lock comprising a threaded bolt; and

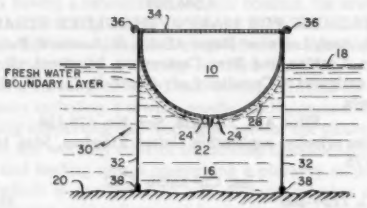
means connected to said detent for manually moving it out of engagement with said lock, said detent releasing said lock when said rudder engages a fixed object, whereby said rudder will kickup.

4,046,094

ANTIFOULING SYSTEM FOR ACTIVE SHIPS AT REST

Herman S. Preiser, 2 Revell Road, Severna Park, Md. 21146, and Arthur Ticker, 12117 Maddox Lane, Bowie, Md. 20715

Filed May 3, 1976, Ser. No. 682,889
Int. Cl.² B63B *29/00*
U.S. Cl. 114—222 **7 Claims**



1. A system for discouraging and inhibiting the growth of the entire marine fouling community onto a ship's underwater hull surface comprising:

means for providing a thin boundary layer of water along the underwater hull surface of low enough salinity to inhibit a portion of the marine fouling community; and

means for excluding all light from underwater hull surface to inhibit another portion of the marine fouling community to thereby inhibit the growth of the entire fouling community.

4,046,095

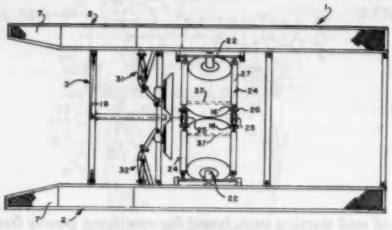
MARINE VESSEL SCRUBBING DEVICE AND METHOD

Don G. Fike, 16 Town & Campus Apts., Fulton, Mo. 65251

Continuation-in-part of Ser. No. 630,807, Nov. 11, 1975, Pat. No. 4,007,701. This application May 24, 1976, Ser. No. 689,136

Int. Cl.[2] B63B *59/00*

U.S. Cl. 114—222 4 Claims



1. In a marine vessel hull cleaning device wherein a floating platform has spaced ways between which a vessel to be cleaned passes lengthwise, the improvement comprising hull scrubbing brushes mounted for rotation on axes generally perpendicular to the long axis of the vessel and at least one transom scrubbing brush supported from said platform, means for moving said transom scrubbing brush clear of the path of said vessel when said vessel moves between said ways, means for moving said transom scrubbing brush into transom engaging position, means for holding said vessel in engagement with said transom scrubbing brush, said holding means comprising means for rotating said hull brushes in a direction such that the engagement of said brushes with the hull of the vessel acts to bias the vessel astern, and means for moving the vessel up and down with respect to said transom scrubbing brushes while the said transom of said vessel is held in engagement with said transom scrubbing brushes.

4,046,096

VESSEL PROPULSION AND/OR STEERING MEANS

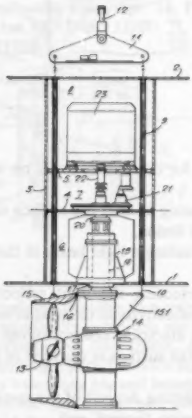
Anders Marius Lisaen, Alesund, Norway, assignor to A.M. Lisaen A/S, Alesund, Norway

Filed June 15, 1976, Ser. No. 696,369

Claims priority, application Norway, June 18, 1975, 752167

Int. Cl.[2] B63H *25/46*

U.S. Cl. 115—35 5 Claims



1. Structure for mounting a propulsion and steering apparatus in a vessel, comprising:

a stationary vertical sleeve member mounted within a sealed chamber in the vessel;

an intermediary sleeve member mounted for axial displacement within said stationary sleeve member;

a rotatable hollow steering column mounted within said intermediary sleeve member and extending outside said chamber underneath a submerged portion of said vessel and including at its lower end a nozzle structure mounted thereon for supporting a propeller and gear housing;

flange connection means including first and second flange members, said first flange member being mounted to the upper end of said rotatable steering column and including a ring member, said first and second flange members releasably engaging one another;

a separable shaft interconnecting said gear housing to a motor and extending through said rotatable steering column and said first and second flange members;

means for releasably locking said intermediary sleeve to said stationary sleeve member, whereby disconnection of said first and second flange members enables said first flange member, said shaft and said rotatable steering column to be lowered within said intermediary sleeve such that said ring member rests on the upper portion thereof adjacent said upper end of said rotatable steering column, and removal of said releasable locking means enables said intermediary sleeve, a portion of said separable shaft and said rotatable steering column to be lowered axially within said stationary vertical sleeve member.

4,046,097

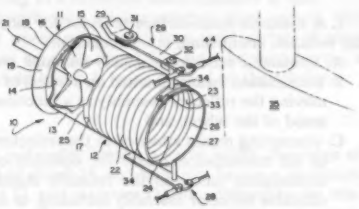
COLLAR FOR REDIRECTING PROPELLER ENERGY

Arthur Charles Hornung, 3143 8th St., Boulder, Colo. 80302

Filed July 19, 1976, Ser. No. 706,830

Int. Cl.[2] B63H *5/14*

U.S. Cl. 115—42 3 Claims



1. A collar for redirecting propeller energy from propeller blades of a propeller driving a watercraft to prevent water from slipping off the ends of the propeller blades so as to maximize the efficiency of the propeller, the invention intended to be used with a propeller of a watercraft and comprising, in combination:

a rigid collar, cylindrical in configuration, consisting of opposed outside and inside surfaces to form a hollow interior along its length, a rear surface, and a front surface with a diameter larger than the diameter of said rear surface to form a larger opening at said front surface than at said rear surface;

a screen covering the entire opening formed by said front surface and provided with a round through hole in its center to allow free passage therethrough of a propeller shaft so as to permit the positioning of the propeller blades within the collar hollow interior;

said rigid collar assembled to a watercraft by securely affixing said front surface of said rigid collar to that portion of a watercraft from which the propeller projects, said front surface being secured thereto in a rigid manner in any conventional way so as to allow free passage of water therethrough; and

a flexible extension connected to said rigid collar, said flexible extension consisting of opposed outside and inside surfaces to form a hollow interior along the length of said

flexible extension with an inside diameter identical to the inside diameter of said hollow interior within said rigid collar, opposed front and rear surfaces with a rigid ring of the same diameter as said flexible extension conjoining said rear surface, wherein further said front surface of the flexible extension conjoins the rear surface of said rigid collar in any conventional way, with said ring similarly conjoining said rear surface of the flexible extension.

4,046,098

ROTATABLE MULTI-SURFACE REFLECTORS FOR BICYCLES

Ralph A. Mancinelli, 23025 Hayes St., East Detroit, Mich. 48021, and Anthony R. Mancinelli, 39330 Donahue Drive, Mount Clemens, Mich. 48043

Filed June 17, 1976, Ser. No. 696,844
Int. Cl.² B60Q *1/30*
U.S. Cl. 116—56 **9 Claims**

1. A rotatable multi-surface reflector for bicycles, and similar vehicles, comprising, in combination:
   A. a rotatable reflector assembly mounted on a vehicle;
   B. transmission means mounted on a wheel of the vehicle for moving the reflector assembly as a function of an angular speed of the wheel; and
   C. connecting means attached to the reflector assembly and to the transmission means for operably connecting the transmission means to the reflector assembly; with the rotatable reflector assembly including, in combination:
   1. a base;
   2. bracket means attached to the base for mounting the base on the vehicle;
   3. reflector means rotatably mounted on the base; and
   4. motion converter means mounted on the base and connected to the connecting means and to the reflector means for imparting an irregular motion to the reflector means.

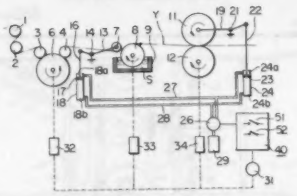
4,046,099

APPARATUS FOR SIZING A YARN SHEET

Tokuji Komatsu, Kanazawa, Japan, assignor to Tsudakoma Kogyo Kabushiki Kaisha, Japan

Filed Nov. 13, 1975, Ser. No. 631,730
Claims priority, application Japan, May 16, 1975, 50-64392
Int. Cl.² B05C *1/08*
U.S. Cl. 118—6 **12 Claims**

1. Apparatus for sizing a yarn sheet comprising, in combination, a rotary feed roller of said yarn sheet a size bath, a rotary sizing roller partly immersed in said size bath, first means for placing said yarn sheet in pressure contact with said sizing roller in the area not immersed in said size bath, a rotary squeeze roller for forming a nip for said yarn sheet in cooperation with a bottom roller, second means for placing said squeeze roller in pressure contact with said bottom roller, a drive motor mechanically coupled to said feed, sizing and bottom rollers, means for simultaneously actuating operations of said first and second placing means, and an automatic control device electrically coupled to said drive motor and said actuating means and provided with stopping and starting switches, said control device comprising means operating immediately in response to actuation of said starting switch for operating said actuating means, and for initiating the operation of said drive motor following a predetermined time after actuation of said starting switch and for removing power from said drive motor immediately upon actuation of said stopping switch and for reversing the operation of said actuating means following a second predetermined time after actuation of said stopping switch, said second predetermined time being sufficient to insure that inertia running of said yarn sheet has come to a complete stop.

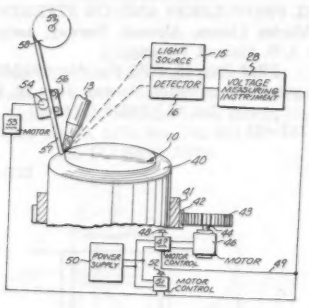


4,046,100

APPARATUS FOR THERMAL DEPOSITION OF METAL

Frederick L. Kuonen, Euclid, Ohio, and Edward M. Boughton, Palos Verdes Estates, Ohio, assignors to TRW Inc., Cleveland, Ohio

Division of Ser. No. 623,647, Oct. 20, 1975, Pat. No. 3,995,073, which is a continuation-in-part of Ser. No. 459,010, April 8, 1974, abandoned. This application Aug. 31, 1976, Ser. No. 719,284
Int. Cl.² B05C *11/00*
U.S. Cl. 118—8 **9 Claims**



1. Apparatus for depositing metal on a surface of an article comprising,
   means for heating at least the surface of the article to a state of incipient fusion,
   means for directing a light beam at the surface during heating,
   means for detecting the light reflectively of the surface including reflectivity at the time of incipient fusion and for creating an electrical control signal from the light reflections from the surface at the time of incipient fusion of the surface,
   means for effecting deposit of the metal on the surface after incipient fusion thereof, and
   means for controlling the deposit of metal on the surface in response to said electrical control signal.

4,046,101

VACUUM APPARATUS FOR TREATING ARTICLES, PARTICULARLY A VACUUM EVAPORATOR

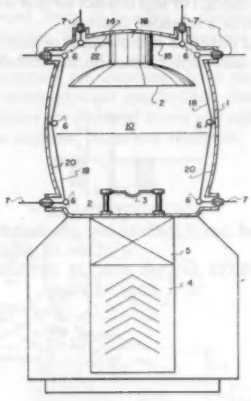
Otto Winkler, Balzers, Liechtenstein, assignor to Balzers Patent-und Beteiligungs-Aktiengesellschaft, Liechtenstein

Filed Sept. 20, 1976, Ser. No. 724,756

Claims priority, application Switzerland, Sept. 23, 1976, 012321/76

Int. Cl.² C23C 13/08

U.S. Cl. 118—49.1 3 Claims



1. A vacuum apparatus for vapor deposition on articles, comprising a housing defining an interior treatment chamber with top, bottom and side walls, article support means in said chamber for supporting an article to be treated, evaporation material support means for supporting a substance to be evaporated spaced from said article support means, pump means connected to said housing for evacuating said housing chamber, a heatable vapor-deposit burner-foil material located in said chamber in spaced relationship to and shielding at least one of said walls, and support means for supporting said foil material within said chamber and for supplying electrical heating current thereto.

4,046,102

YARN PARAFFINING DEVICE

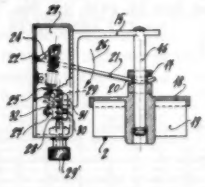
Mario Piro, Genoa, Italy, assignor to Nuova San Giorgio S.p.A., Genoa-Sestri [illegible]aly

[illegible]d Apr. 13, 1976, Ser. No. 676,469

Claims [illegible]ity, application Italy, Apr. 14, 1975, 22307/75

Int. Cl.² B05C 11/00

[illegible]—78 12 Claims



1. Apparatus for applying paraffin to a yarn filament comprising a frame, a longitudinally extending pin supportable in a fixed positional relationship to said frame, a paraffin block support member comprising a paraffin block support surrounding said longitudinally extending pin and being freely rotatable relative to the longitudinal axis of said pin, said paraffin block support being mounted for slidable movement longitudinally with respect to said pin, means for applying a force to said paraffin block support for urging said paraffin block support in a first longitudinal direction relative to said pin comprising a lever mounted for pivotal movement about a pivot axis which is fixed with respect to said pin, said lever having a portion engageable with a portion of said paraffin block support, spring means for urging said lever in a forward rotational direction about said pivot axis for applying a force couple to said lever arm for urging said paraffin block in said first longitudinal direction, said spring means including means for maintaining a substantially constant force couple about said pivot axis for all operative pivotal movements of the lever arm about said pivot axis.

4,046,103

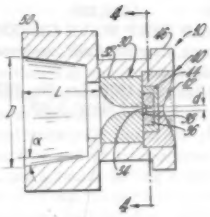
IMPREGNATING DIE

Paul D. Yakuboff, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 29, 1976, Ser. No. 671,654

Int. Cl.² B05C 11/02, 11/10

U.S. Cl. 118—125 5 Claims



1. A die comprising:

a. a die insert having a bore with a tapered entrance, said bore tapering to a minimum inside diameter *d;* and,

b. an inlet duct having a frustro-conical inner surface, said inlet duct opening into said bore, said surface sloping inwardly at an angle about 8°, said inlet duct having a length L, said length L being defined by the relation

$$L = rd$$

wherein *r* is a parameter having a value within the range of from about 10 to about 25, and said inlet having a maximum inside diameter D, said diameter D being defined by the relation

$$D = sd$$

wherein *s* is a parameter having a value within the range of from about 15 to about 35.

4,046,104

FLOW COAT HEAD FOR CURTAIN COATING MACHINES

Frank Stuhlman, Rte. 126 East, Plainfield, Ill. 60544

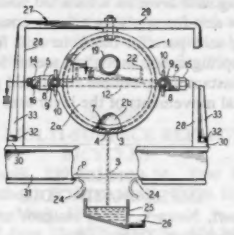
Filed June 22, 1976, Ser. No. 698,347

Int. Cl.² B05B 1/30

U.S. Cl. 118—300 13 Claims

1. A flow coat head for curtain coating, particularly of sheet material, comprising a container for the coating material having a pair of end walls, and a pair of walls extending therebetween and connected to one another to form a relatively rigid body, said walls having spaced opposed edges, defining an elongated longitudinally extending slot therebetween at the bottom of the container, which slot forms the material discharge opening of the head, the end edges of at least one of said oppositely disposed walls being laterally movable, adjacent said slot, relative to the adjoining portions of said walls, said slot, in an unstressed condition of said body, having a transverse width equal to at least the maximum desired operating

width, and means engaged with said laterally movable wall for applying pressure thereon, relative to the other of said oppositely disposed walls, greater than the normal inherent rigidity



between said opposed walls, to relatively move the edges of said slot toward one another and thereby vary the effective width thereof.

4,046,105

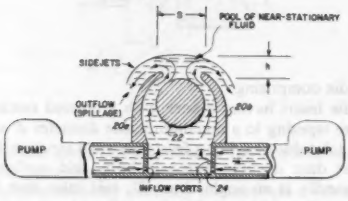
LAMINAR DEEP WAVE GENERATOR

Nicolas Gueco Gomez, Cerritos, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed June 16, 1975, Ser. No. 587,946

Int. Cl.[2] B05C *5/02*

U.S. Cl. 118—429 **6 Claims**



1. Apparatus for generating a near stationary central pool of liquid in a wave generator comprising

means for imparting a motive force to a liquid,

a first generally cylindrical support means positioned transverse to the flow of the liquid for dividing the moving flow of liquid,

a vertically disposed conduit means for constraining the flow of liquid to the shape of said first support means so as to generate first and second side jets of liquid, said conduit means being higher at the upper extremities thereof than the first support means and spaced apart from said first support means to form an opening for the outflow of said liquid, said liquid flowing out and over the sides of said conduit means due to the force of gravity, the pool of liquid formed at the center of the outflow opening being nearly stationary.

4,046,106

APPARATUS AND METHOD OF FORMING SELF-LOCKING FASTENER

James Lee Bowman, Cincinnati, Ohio, assignor to Long-Lok Fasteners Corporation, Cincinnati, Ohio

Filed May 8, 1975, Ser. No. 575,972

Int. Cl.[2] B05C *1/02*

U.S. Cl. 118—620 **14 Claims**

1. An apparatus for forming a self-locking patch type fastener comprising:

carrier means for moving a plurality of threaded metal fasteners along an arcuate path in a continuous manner;

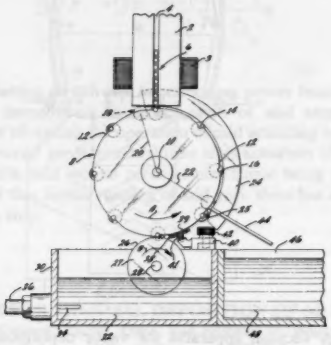
clamping means associated with said carrier means to clamp said fasteners to said carrier means during said movement of the fasteners along an arcuate path;

movable resin transfer means having a fastener contact surface to transfer resin to a fastener;

said transfer means being positioned to move said contact surface into contact with a fastener as said fastener moves in an arcuate path past said transfer means while the fastener is clamped to said carrier means;

said transfer means providing movement of said contact surface along an arcuate path with the arcuate path of movement of said contact surface being substantially tangential to the arcuate path of movement of said fasteners during contact of said contact surface with a portion of the threads of a threaded fastener;

the speed and direction of movement of said contact surface relative to said carrier means during contact between said



contact surface and said fastener providing an even transfer of resin from said contact surface to a portion of the threads of said fastener to deposit a plastic patch on the portion of the fastener threads contacted by the contact surface;

said plastic patch being in intimate contact with the roots and flanks of the thread portion contacted by said contact surface;

unclamping means positioned with respect to said carrier means to unclamp said threaded fasteners after the deposit of a plastic patch on the portions of the threads of the fasteners contacted by said transfer means, and

conveyor means to convey the fasteners away from said carrier means after unclamping of the fasteners from the carrier means by said unclamping means.

4,046,107

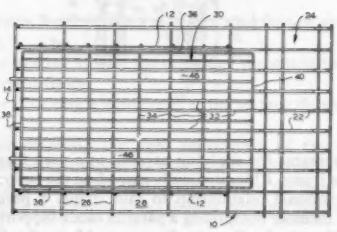
LAYING CAGE SUBFLOOR

Herman A. Kuster, 916 Edon Road, Camden, Mich. 48232

Filed July 14, 1976, Ser. No. 705,287

Int. Cl.[2] A01K *31/16*

U.S. Cl. 119—17 **9 Claims**



1. A laying cage for fowl comprising, in combination, an enclosure defined by side walls, end walls and a floor, said floor consisting of an open grate defined by a plurality of

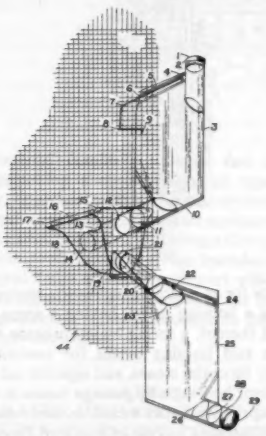
longitudinal elements affixed to a plurality of transverse elements, said longitudinal elements being transversely spaced from each other and direction of said longitudinal elements whereby said elements define openings therebetween permitting droppings to readily pass therethrough, a subfloor directly supported upon said floor, said subfloor comprising a plurality of longitudinal members affixed to a plurality of transverse members, said longitudinal members being transversely spaced from each other a distance substantially equal to the spacing between said longitudinal elements and said transverse members being spaced from each other a distance substantially equal to the spacing between said transverse elements, and means locating said subfloor upon said floor whereby said longitudinal members are disposed above and substantially equidistant between adjacent longitudinal elements and said transverse members are disposed above and substantially equidistant between adjacent transverse elements.

4,046,108

FEEDING DEVICE

Dennis Erwin Balgemann, and Michael Wong, both of 954 Cookane Ave., Elgin, Ill. 60120

Filed Feb. 12, 1976, Ser. No. 657,591
Int. Cl.[2] A01K *5/00*
U.S. Cl. 119—18 **3 Claims**



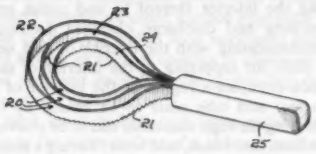
1. A feed dispenser, spillage collector and recycling device comprising a storage bag for feed having a upper sleeve and a lower sleeve, a rigid filling tube received in said upper sleeve having a closure on the outer end of said tube, a rigid feed tube received in said lower sleeve extending downwardly from said storage bag, means to support said storage bag from the wall of a cage, a dorsal opening at the lower end of said feed tube for access by a bird to feed located in said feed tube, a stiff collector chute arranged to close the lower end of said feed tube and surround said dorsal opening for catching spillage resulting from a bird removing feed from said opening, said collector chute having means for attachment to a cage wall located on the upper portion of the rear wall of said chute, perches attached to the upper edges of the front and side walls of said chute, a rigid spill return tube attached at an upper end to the lower end of said collector chute, a collector bag having an upper sleeve and a lower sleeve, said upper sleeve receiving the lower end of said spill return tube, said collector bag having a slopped bottom with a rigid emptying tube received in said lower sleeve, means to support said collector bag from the wall of a cage, closure means over the lower end of said emptying tube for periodic removal of the contents therein, thus allowing recycling of the contents, before or after winnowing, and replacement of the useable contents into said upper storage bag.

4,046,109

IMPLEMENTS FOR SUCH USES AS ANIMAL GROOMING, FISH SCALING, AND VEGETABLE GRATING

Harry R. Miller, 751 Potomska Road, and Paul A. Borba, 626 Smith Neck Road, both of South Dartmouth, Mass. 02748

Filed Feb. 27, 1975, Ser. No. 553,670
Int. Cl.[2] A01K *13/00*
U.S. Cl. 119—92 **3 Claims**



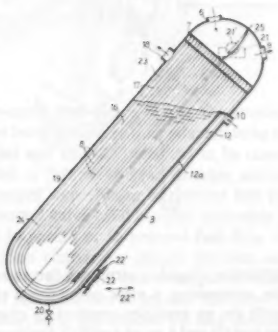
1. An implement such as an animal grooming, fish scaling, and vegetable grating implement, said implement including a plurality of blades of the band saw type, each blade including a loop portion and outwardly flared tail portions, one loop portion within another and its tail portions between the tail portions thereof, and a handle having a slot-shaped socket in one end receiving all of said tail portions as a force fit assembly and with the socket side walls holding said tail portion tightly compressed with their teeth in engagement with an end wall of the socket, the handle of a material that is cut by said teeth, said tail portions shaped and dimensioned to provide that the free end of the assembly may be held for free entry into the socket, the frictional resistance of said assembly to movement lengthwise of said socket increasing towards the other end of the assembly.

4,046,110

STEAM GENERATORS

Kurt Fritz, Klosterneuburg, and Georg Beckmann, Vienna, both of Austria, assignors to Waagner-Biro Aktiengesellschaft, Austria

Filed Apr. 24, 1975, Ser. No. 571,357
Claims priority, application Austria, Apr. 25, 1974, 3405/74
Int. Cl.[2] F22B *1/06*
U.S. Cl. 122—32 **6 Claims**



1. In a steam generator, an elongated vessel having opposed upper and lower ends, said vessel carrying a tube plate extending transversely across the interior of said vessel adjacent said upper end thereof and said vessel carrying in its interior above

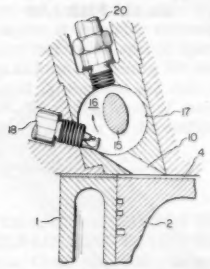
said tube plate a partition means dividing the space in said vessel above said tube plate into heating-medium receiving and discharge chambers, heating-medium supply means communicating with said heating-medium receiving chamber for supplying a fluid heating medium thereto, heating-medium discharge means communicating with said discharge chamber for discharging the heating medium therefrom, a bundle of tubes situated in said vessel and extending from said tube plate to the region of the lower end of said vessel, each of said tubes having an inlet end communicating through said tube plate with said receiving chamber and an outlet end communicating through said tube plate with said discharge chamber while each tube has a substantially U-shaped end situated at the region of said lower end of said vessel, so that the heating medium delivered to said receiving chamber flows through said inlet ends of said tubes along the interior thereof to said outlet ends thereof before reaching said discharge chamber, feedwater supply means communicating with the interior of said vessel below said tube plate for supplying to the interior of said vessel a liquid which occupies a region of the interior of said vessel situated below said tube plate to be heated by the heating medium flowing through said tubes and to be converted by the heating medium into steam, said vessel having a steam chamber situated in its interior above the liquid supplied by said feedwater supply means and defined at least in part by a lower surface of said tube plate which is directed toward said lower end of said vessel, and steam-discharge means communicating with the interior of said vessel at said steam chamber thereof for the discharging steam from said steam chamber, said vessel having a longitudinal axis with said upper end of said vessel being situated along the latter axis at an elevation higher than said lower end of said vessel, and support means supporting said vessel at an inclined attitude with said lower end of said vessel situated at an elevation lower than but out of line with said upper end of said vessel, and with said tube plate extending transversely across said axis and also being inclined with respect to a vertical plane so that on one side of said axis said tube plate is higher than at an opposite side of said axis.

4,046,111

COMBUSTION CHAMBER OF INTERNAL COMBUSTION ENGINE

Tetsuro Nagano, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Feb. 5, 1976, Ser. No. 655,474
Claims priority, application Japan, Feb. 20, 1975, 50-020330
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 SP **9 Claims**



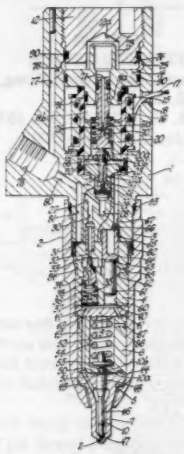
1. In a combustion chamber structure for an internal combustion engine, comprising a main combustion chamber supplied solely with air, an auxiliary combustion chamber having a fuel injection nozzle and a spark ignition device communicating therewith, a transfer passage which interconnects said main and auxiliary combustion chambers and which is substantially tangential to said auxiliary combustion chamber at its point of communication, and an obstacle positioned in said auxiliary combustion chamber so that said auxiliary combustion chamber is shaped as an annulus, said obstacle having a smooth and continuous rounded outer surface, the improvement wherein said spark ignition device communicates directly with said auxiliary combustion chamber, wherein the distance between the interior wall of the auxiliary combustion chamber and the outer surface of the obstacle varies along the periphery of the obstacle, and wherein said spark ignition device is positioned where said distance is large.

4,046,112

ELECTROMAGNETIC FUEL INJECTOR

John I. Deckard, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 20, 1975, Ser. No. 623,947
Int. Cl.² F02M *39/00*
U.S. Cl. 123—32 JV **3 Claims**



1. A fuel injector for an internal combuation engine, said fuel injector including a housing means having a spray tip outlet means at one end thereof, a spring-biased injector valve slidably mounted in said housing means for controlling flow through said spray tip outlet means, said injector valve providing with said injector housing a tip passage means in communication with said spray tip outlet means as controlled by said injector valve, said housing having an inlet port for connection to a source of high pressure fuel, a return port for connection to a low pressure fuel reservoir and, a control chamber, passage means including a check valve controlled orifice passage operatively connected at one end to said inlet port and at its other end to said tip passage and a charge orifice passage also operatively connected at one end to said inlet port and at its other end to said control chamber, a bleed return passage means including a bleed orifice connected at one end to said control chamber and at its other end to said return port, a stepped booster pump cylinder means in said housing defining a secondary pump chamber in fluid communication with said tip passage means and a primary pump chamber of larger diameter than said secondary pump chamber, a fuel charge passage means including a control orifice in communication at one end with said control chamber and at its opposite end with said primary pump chamber, a stepped piston means reciprocably received in said booster pump cylinder means and a solenoid actuated valve means positioned in said injector housing for movement between a first position to control the flow of fluid through said charge orifice passage into said control chamber for flow to said primary pump chamber while blocking flow of fluid from the said control chamber through said bleed orifice and a second position blocking flow of fluid through said charge orifice passage into said control chamber while permitting flow of fluid from said control chamber

through said bleed orifice, said control orifice being of smaller size than the size of said bleed return orifice, said bleed orifice and said charge orifice passage being axially aligned in spaced apart relation to each other and, said solenoid actuated valve means including a solenoid having a movable armature supporting a retractor valve and an opposed axially aligned control valve for movement therewith relative to said bleed orifice and said charge orifice passage.

4,046,113

INTERNAL COMBUSTION ENGINE FUEL INJECTION CONTROL SYSTEM

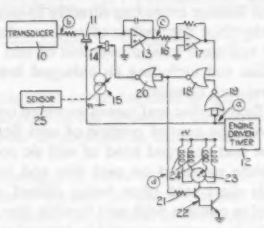
John Howard Moore, Redditch, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Feb. 5, 1976, Ser. No. 655,657

Claims priority, application United Kingdom, Feb. 12, 1975, 5884/75

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **7 Claims**



1. An internal combustion engine fuel injection control system comprising a corona-discharge type air mass flow transducer, together with an injection control circuit and means sensitive to the humidity of air aspirated into the engine, said injection control circuit including a first circuit part which is responsive to the output of the transducer to generate a control signal and a second circuit part which is sensitive to said control signal and to the output of the humidity sensitive means to generate a signal dependent on the humidity of air aspirated into the engine.

4,046,114

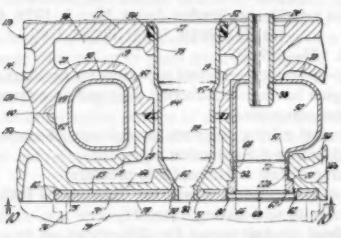
INSULATED, HIGH EFFICIENCY, LOW HEAT REJECTION, ENGINE CYLINDER HEAD

Nshan Hamparian, Brighton, and Michael Bandrowski, Jr., Milford, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 6, 1975, Ser. No. 619,799

Int. Cl.² F01P *3/14*; F02F *1/26*; F01N *3/02*

U.S. Cl. 123—41.76 **4 Claims**



1. A cylinder head for an internal combustion engine having a lower wall adapted for mounting opposite the end of an associated engine cylinder, said head defining a coolant jacket extending along said lower wall, a recess in the outer surface of said lower wall and means defining an exhaust port extending through said coolant jacket and said lower wall within said recess,

a combined valve seat and exhaust port insert in said exhaust port and extending inwarding from said lower wall adjacent said coolant jacket, said insert having an annular ring portion seated in said lower wall and protruding therefrom into said recess and a reduced diameter tubular passage portion extending into said port and at least partially spaced therefrom to form an insulating space around the insert that is effective to limit heat transfer from exhaust gases in said insert passage portion to the adjacent cylinder head coolant jacket and

a high temperature metal alloy fire deck insert received in and substantially filling said lower wall recess, said fire deck insert having an outer surface engagable with and adapted to close the end of such associated engine cylinder and having an exhaust opening in alignment with said exhaust port and encircling the protruding end of said valve seat and port insert,

said fire deck insert including an inner surface in opposed relation to the outer surface of said lower wall recess and means separating said opposing surfaces to provide an insulating clearance between said insert and said head over a major portion of said fire deck insert inner surface, thereby limiting heat flow from the associated engine cylinder to the cylinder head coolant jacket.

4,046,115

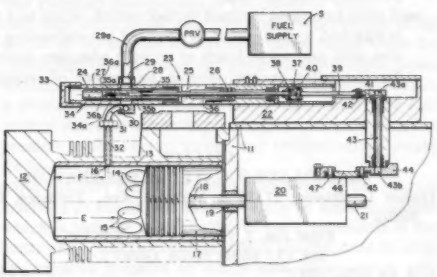
FREE PISTON ENGINE FUEL FEEDING APPARATUS

Anton Braun, 6421 Warren Ave., Minneapolis, Minn. 55435

Filed June 16, 1975, Ser. No. 586,963

Int. Cl.² F02B *71/00*; F02D *39/10*

U.S. Cl. 123—46 R **9 Claims**

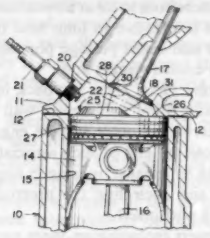


1. In a two-cycle free piston engine the combination comprising a valve body having an inlet adapted to be connected to a source of fuel and an outlet adapted to be connected to an engine cylinder, a first valve head member moveable in said body and arranged to permit or to prevent fuel flow through said body, a second valve head member moveable in said body and arranged to permit or to prevent fuel flow through said body, lost-motion connection means between said first and second valve head members and arranged to cause the combined action of said members to prevent fuel flow through said body when they both are moved by said means when said means moves in one direction and to re-arrange and to move said valve head members so as to permit fuel to flow through said body during a portion of the reverse movement of said means, and means for operably connecting said lost-motion connecting means to a portion of the engine that moves in synchronism with the engine's piston.

4,046,116
INTERNAL COMBUSTION ENGINES

William E. Burnham, 812 Riverview Drive, Leavittsburg, Ohio 44485

Filed Mar. 26, 1976, Ser. No. 670,720
Int. Cl.[2] F02B 75/04
U.S. Cl. 123—48 R 5 Claims



1. In an overhead valve internal combustion engine, including an engine block having at least one cylinder in which a piston is reciprocable along an upright axis between upper and lower positions, said engine also including a head connected to said block to overlie the upper end of said cylinder and to cooperate therewith to form a compression chamber, and intake and exhaust valves mounted on said head for reciprocation along respective axes, each of which is at the same acute angle to the axis of reciprocation of said piston, each of said valves having a flat head movable into said compression chamber when the valve is open, the improvement for increasing the compression ratio of said cylinder, comprising:

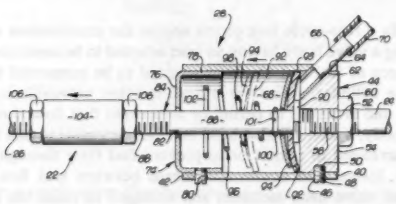
a separate metal plate adapted to be attached to the upper face of said piston, said plate being of a peripheral size to lie within the confines of the piston periphery and of a thickness to extend upwardly from said piston face a predetermined amount,

said plate having an inclined surface which, when said plate is attached to said piston, is disposed in confronting relation with said valve heads to provide adequate clearance for the latter during opening movement of respective valves.

4,046,117
VACUUM SUBJUGATED ACCELERATOR

Homer L. Brinlee, 21330 S. Vermont Ave., Torrance, Calif. 90502

Filed Jan. 2, 1976, Ser. No. 646,246
Int. Cl.[2] F02D 11/08; G05G 1/14
U.S. Cl. 123—103 C 4 Claims



1. A vacuum subjugated accelerator apparatus for use with an internal combustion engine interposed in control linkage between a foot accelerator and carburetor throttle for modulating the flow of gasoline to said carburetor and in turn achieving an optimum vacuum within an intake manifold of said engine for motor efficiency and gas savings comprising:

an annular housing having forward and rearward ends and a horizontal axis, said housing including an end wall closing said forward end of said housing;

a removable cap sealing said rearward end of said housing, said cap having a bore extending therethrough on the horizontal axis of said housing;

said housing, end wall and cap means, defining a vacuum chamber;

coupling means associated with said end wall receiving a portion of said control linkage extending directly to said throttle of said carburetor whereby horizontal movement of said housing will impart direct opening and closing of said throttle;

a vacuum port extending through said end wall communicating with said vacuum chamber adapted to receive tubular means extending from said intake manifold of said engine to said vacuum port to create a vacuum within said vacuum chamber;

a slidable disc rod extending from within said chamber through said bore of said cap means axially aligned on said housing axis, said disc rod coupled to a portion of said control linkage extending directly to said foot accelerator whereby foot depression of said accelerator will impart direct rearward axial movement of said slidable disc rod, said disc rod including an enlarged head portion within said vacuum chamber;

annular flexible disc seal means mounted on said slidable disc rod with the central portion of said flexible disc bearing against said enlarged head of said sic rod;

a disc plate mounted on said disc rod rearwardly of said flexible disc, said plate being dished with a periphery thereof in contact with said flexible disc biasing said flexible disc in a concave position toward said front wall;

spring means including a portion locking said disc plate against said flexible disc and additionally extending rearwardly therefrom toward said cap means;

said flexible disc seal being adapted to be further peripherally curved away from the annular interior of said housing toward said end wall when a higher vacuum is produced through said vacuum port whereby drag on said flexible disc and in turn said disc rod and linkage extending to said accelerator is created yet said disc rod and flexible disc seal being movable from said end wall toward said cap means without directly affecting the opening of said throttle and said flexible disc seal yieldably returnable to a position wherein there is partial contact between said flexible disc and said end wall in an optimum position whereby direct movement of said control linkage and vacuum subjugated accelerator means can be achieved.

4,046,118
AIR FUEL MIXTURE CONTROL APPARATUS FOR CARBURETED INTERNAL COMBUSTION ENGINES

Shigeo Aono, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 7, 1975, Ser. No. 630,043
Claims priority, application Japan, Nov. 8, 1974, 49-128612
Int. Cl.[2] F02B 33/00; F02M 7/00
U.S. Cl. 123—119 EC 10 Claims

1. Air-fuel mixture control apparatus for an internal combustion engine having an induction pipe and an exhaust pipe the apparatus comprising:

an air-fuel mixing chamber for delivery of a mixture of air and fuel to the induction pipe;

a source of fuel at atmospheric pressure;

fuel supply conduit means for delivery of fuel from said source to said mixing chamber;

air bleed conduit means for delivery of air to said mixing chamber;

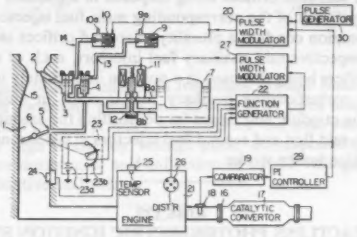
an exhaust composition sensor disposed in the exhaust pipe for detecting the concentration of a composition of the exhaust emissions from the engine to provide a concentration representative signal;

means for modulating the magnitude of the concentration

representative signal in accordance with a predetermined control characteristic to generate a first error correction signal;

means for detecting an operating parameter of the engine to produce a parameter representative signal;

means for modulating the magnitude of the parameter representative signal in accordance with a predetermined characteristic as a function of the detected parameter of the engine for generating a second error correction signal;



a first electromagnetic valve disposed in the air bleed conduit means to control the amount of air delivered to said mixing chamber in response to the first error correction signal; and

a second electromagnetic valve disposed in the fuel supply conduit means to control the amount of fuel delivered to said mixing chamber in response to the second error correction signal.

4,046,119

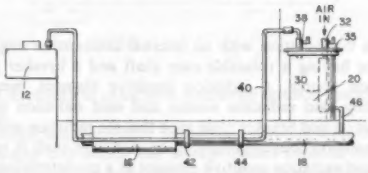
WATER VAPOR INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Frank Perry, 3295 W. 4th Ave., Hialeah, Fla. 33012

Filed Jan. 19, 1976, Ser. No. 650,363

Int. Cl.[2] F02M *25/06, 17/22;* F02B *77/05*

U.S. Cl. 123—119 A **3 Claims**



1. Apparatus for injecting controlled amounts of water vapor into an internal combustion engine comprising in combination:

an internal combustion engine including an intake manifold for the introduction of a combustible gaseous mixture into the cylinders of said engine and an exhaust system for the discharge of combusted gases from said engine;

a receptacle for storing a supply of liquid water in fixed relation to said engine;

an air inlet in the upper portion of said water receptacle and first conduit means connected thereto having its air discharge end terminating at a lower level within said receptacle;

an outlet for water vapor in the upper portion of said water receptacle and second conduit means connected at one end thereto and at the other end to said intake manifold for withdrawing water vapor from said receptacle and for conducting same to said intake manifold by virtue of the suction forces created in said intake manifold;

and third conduit means connected at one end to said exhaust system and the other end extending into the discharge end of said first conduit for aspirating air from said air conduit in direct relation to the power output of the engine.

4,046,120

REGULATING SYSTEM WITH ELECTROMAGNETIC VALVE AND CONTROL VALVE

Bernard R. Laprade; Xavier J. Laprade, both of Arudy - 64 260, and Pierre J. Gele, 3, rue Vaussenat, Tarbes, all of France

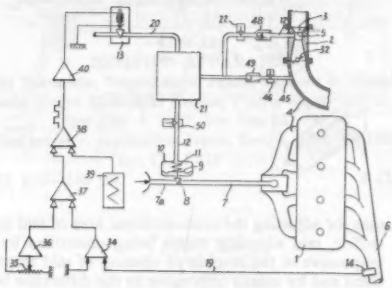
Filed Sept. 11, 1975, Ser. No. 612,457

Claims priority, application France, Sept. 27, 1974, 74.32606; June 18, 1975, 75.19078

The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.

Int. Cl.[2] F02M *21/07*

U.S. Cl. 123—120 **10 Claims**



1. An arrangement for correcting the proportion of the air and fuel mixture furnished to an internal combustion engine having an induction manifold containing a venturi and a butterfly valve for determining the air flow rate, and an exhaust manifold, said arrangement comprising:

means defining at least one gas inlet connected to the induction manifold downstream of the butterfly valve,

means responsive to the negative pressure prevailing at the throat of the venturi upstream of the butterfly valve for controlling flow through said gas inlet, said control means including a control valve having a preloaded diaphragm, a conduit connecting the throat of the venturi and said control valve for subjecting the diaphragm to the negative pressure at the venturi throat, and resilient return means for biasing said diaphragm, and

electric circuitry including a sensor disposed in the exhaust manifold of the engine for delivering an electric current which is variable as a function of the composition of the burnt gases, and an electromagnetic valve for modulating the negative pressure to which said diaphragm is subjected, said electromagnetic valve being regulated in response to the electric current delivered by said sensor.

4,046,121

FUEL SUPPLY DEVICES FOR INTERNAL COMBUSTION ENGINES

Michel E. Pierlot, Le Pecq, France, assignor to Societe Industrielle de Brevets et d'Etudes S.I.B.E., France

Filed July 25, 1975, Ser. No. 599,025

Claims priority, application France, Aug. 1, 1974, 74.26793

Int. Cl.[2] F02M *39/00*

U.S. Cl. 123—139 AW **9 Claims**

1. A device for supplying fuel to an internal combustion engine having an intake pipe, said device comprising:

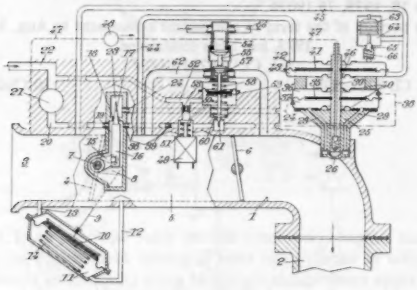
a source of fuel,

injector means for injecting fuel into the engine intake, said injector means including a fuel chamber and at least one injection orifice of adjustable cross-sectional area for fuel flow out of said chamber,

fuel conduit means receiving fuel from said fuel source and discharging fuel into said chamber,

an auxiliary throttle element located in the intake pipe of the engine and opening automatically and progressively in dependence upon the rate of engine intake air flow,

proportioning valve means disposed in said fuel conduit, said valve means being operatively connected to said auxiliary throttle element to proportion the cross-sectional area of the fuel conduit means available for fuel flow to the amount of opening of said auxiliary throttle element, and



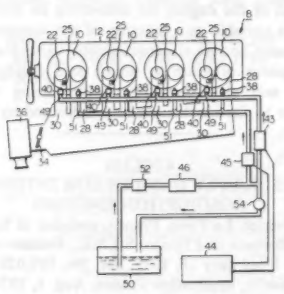
means for adjusting the cross-sectional area of said injection orifice, said adjusting means being controlled by means responsive to the amount of opening of said throttle element and by means responsive to the difference between the pressure upstream and that downstream of the auxiliary throttle element, whereby the cross-sectional area of said injection orifice is increased in proportion to the amount of opening of the auxiliary throttle element and to said pressure difference.

4,046,122

FUEL FEED CONTROL SYSTEM OF INTERNAL COMBUSTION ENGINE

Ryoichi Nakagawa, Tokyo; Shuya Nambu, Yokosuka, and Hidehiro Minami, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 455,274, March 27, 1974, Pat. No. 3,980,058. This application Apr. 29, 1976, Ser. No. 681,376
Claims priority, application Japan, Mar. 28, 1973, 48-35444
Int. Cl.[2] F02B *19/10, 19/18*
U.S. Cl. 123—139 AW **5 Claims**



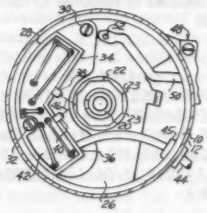
1. In a fuel supply system for supplying a predetermined amount of fuel to main combustion chambers as well as to auxiliary combustion chambers of a torch type internal combustion engine, said fuel supply system including a fuel injection pump for pumping the fuel into said main and auxiliary combustion chambers from a fuel tank; a plurality of main fuel injectors respectively mounted in a plurality of main branches which are respectively communicated with said main combustion chambers through main intake valves, said main fuel injectors being fluidly and parallelly connected to said fuel injector pump through a first common conduit; and a plurality of auxiliary fuel injectors respectively mounted in a plurality of auxiliary branches which are respectively communicated with said auxiliary combustion chambers through auxiliary intake valves, said auxiliary fuel injectors being fluidly and parallelly connected through a second common conduit to said fuel injection pump, the improvement comprising a plurality of first orifices associated with respective said main fuel injectors, each of said first orifices being disposed in a position immediately upstream of the corresponding main fuel injector in said first common conduit; a plurality of second orifices associated with respective said auxiliary fuel injectors, each of said second orifices being disposed in a position immediately upstream of the corresponding auxiliary fuel injector in said second common conduit; and means for controlling the amount of fuel led into said first and second fuel injectors in synchronism with the engine intake stroke.

4,046,123

CONTACTLESS PHOTOELECTRIC IGNITION SYSTEM

Richard J. Jordan, 15821 Chestnut, Roseville, Mich. 48066, and Charles W. Travis, 702 Satterlee, Bloomfield Hills, Mich. 48013

Filed Jan. 29, 1976, Ser. No. 653,368
Int. Cl.[2] F02P *1/00;* **F02B** *3/00*
U.S. Cl. 123—146.5 A **16 Claims**



1. In combination with an internal combustion engine distributor having a rotatable cam shaft and a breaker plate, a radiation source, a radiation sensitive element, means for mounting said radiation source and said radiation sensitive element on said breaker plate such that the radiation emitted by said radiation source impinging on said cam shaft is reflected onto said radiation sensitive element at a predetermined angular position of said cam shaft and means for connecting said radiation sensitive element to a utilization circuit.

4,046,124

HIGH PERFORMANCE IGNITION CIRCUIT

Leslie T. Long, 9016 A Canal St., Orange, Calif. 92665

Filed Sept. 10, 1975, Ser. No. 612,200
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.
Int. Cl.[2] F02D *1/00*
U.S. Cl. 123—148 E **6 Claims**

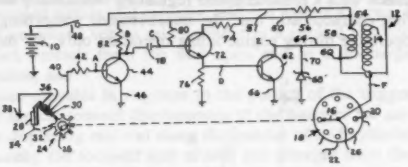
1. In an ignition system for a multicylinder internal combustion engine having a source of electrical energy, a coil comprising primary and secondary windings, circuit means across said source and in series with said primary windings and including normally conducting switching transistor means, the improvement comprising:

a. voltage pulse generating means having a characteristic induced voltage pulse with a sharp voltage reversal inflection point;

b. high frequency pass RC filter means in circuit between said inductive coil means and the base of said switching

means to pass only a high frequency voltage pulse responsive to the voltage reversal inflection point of the cyclic voltage induced in said inductive coil means; and

c. means including a driver transistor in emitter-base connection between said switching transistor and said filter



means to apply said high frequency voltage pulse to bias said switching means and momentarily open said circuit means of said primary windings for the time duration of the high frequency voltage pulse, corresponding to the time duration of said inflection of cyclic voltage in said inductive coil means.

4,046,125

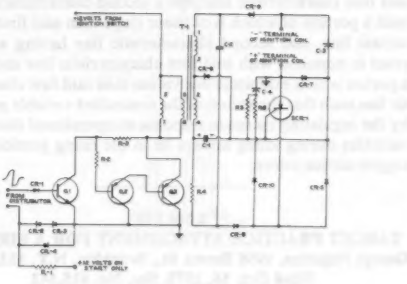
CAPACITIVE DISCHARGE IGNITION SYSTEM

Ronald D. Mackie, 5500 Sea Spray Drive, Pensacola, Fla. 32507

Filed Oct. 17, 1975, Ser. No. 623,225

Int. Cl.[2] F22B *7/00*

U.S. Cl. 123—148 E **14 Claims**



1. A breakerless capacitive discharge ignition system, comprising,

a breakerless distributor including a rotating member and a pickup coil which has voltage pulses induced therein as said member rotates, each of said induced voltage pulses having a positive and negative excursion,

a step-up transformer having a primary winding and a secondary winding,

a primary circuit comprising said primary winding, a battery and a switch means,

a discharge capacitor,

a silicon controlled rectifier and an ignition coil being connected in circuit relationship with each other, with said discharge capacitor, and with the secondary winding of said transformer,

means for applying the voltage induced across said secondary winding of said transformer when said primary circuit closes to said discharge capacitor to charge it,

means for discharging said discharge capacitor through said silicon controlled rectifier and said ignition coil when said primary circuit opens to provide an ignition spark,

storage capacitor means for aiding said transformer in charging said discharge capacitor,

means for charging said storage capacitor when said primary circuit opens,

said switch means comprising means controlled by said induced voltage pulses for closing and opening said primary circuit for causing current to flow and stop flowing in said primary circuit, and including a first transistor switch means for closing said primary circuit during said positive excursions of said pulses for allowing current from said battery to flow through said primary winding of said transformer, the trigger path of said transistor switch consisting of at least a diode directly connected to said transistor in the base-emitter circuit thereof, said at least a diode having a short circuit voltage of a first predetermined amplitude level and means for closing said transistor switch means when said positive part of said pulse rises above said first amplitude level and for opening said transistor switch means when said positive part of said pulse falls below said first amplitude level, said at least a diode being effective to block the negative part of said pulses from said transistor switch means.

4,046,126

IGNITION APPARATUS

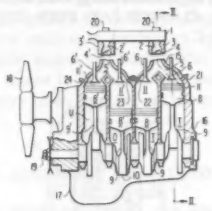
Takashi Takemoto, Nagaokakyo, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 4, 1975, Ser. No. 637,794

Claims priority, application Japan, Dec. 4, 1974, 49-140002

Int. Cl.[2] F02P *5/10*

U.S. Cl. 123—148 DS **6 Claims**



1. Ignition apparatus for use in a multi cylinder internal combustion engine having a first group of cylinders, means for supplying at least one cylinder of said first group of cylinders with an enriched air-fuel mixture relative to stoichiometric air-fuel ratio, a second group of cylinders, and means for supplying at least one cylinder of said second group of cylinders with a lean air-fuel mixture relative to stoichiometric air-fuel ratio, said ignition apparatus comprising ignition timing control means responsive to the rpm of the said engine for retarding the ignition timing of said second group of cylinders relative to the ignition timing of said first group of cylinders when the engine is operated at low and medium loads and for advancing the ignition timing of said second group of cylinders relative to the ignition timing of said first group of cylinders when said engine is operated at heavy loads.

4,046,127

SPARK BOOSTING DEVICE

Edgar Almquist, and Richard Almquist, both of Milford, Pa. 18337

Filed Jan. 5, 1976, Ser. No. 646,610

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—148 A **20 Claims**

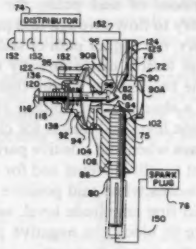
1. A spark booster for the ignition system of an internal combustion engine comprising

a housing, said housing being made of electrically non-conductive material;

first and second electrically conductive members supported by said housing, said members being in axial alignment and being longitudinally spaced from each other to define a spark gap,

an electrically conductive bimetallic element which moves

laterally and is disposed in said housing for axially varying the distance across said spark gap in response to variations



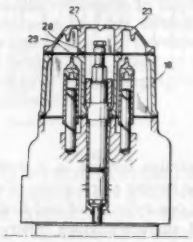
in the temperature in said housing so that increases in temperature causes said spark gap to be reduced.

4,046,128

CYLINDER HEADS FOR INTERNAL COMBUSTION COMPRESSION-IGNITION ENGINES

Antonio Formia, Turin, Italy, assignor to FIAT Societa per Azioni, Turin, Italy

Filed Oct. 16, 1975, Ser. No. 623,161
Claims priority, application Italy, Oct. 28, 1974, 70187/74
Int. Cl.² F02F *7/00*; F02B *77/00*
U.S. Cl. 123—195 C **2 Claims**



1. In a diesel internal combustion engine of the type having a cylinder head having four valves and a fuel injector located between the four valves the improvement comprising a casing mounted on said cylinder head and surrounding said valves and injector, said casing having a pair of spaced apart vertical walls extending across said casing to divide the interior of said casing into three compartments with said injector located in a separate one of said compartments, a cover secured to said casing having a pair of spaced apart depending ribs disposed in engagement with said vertical walls and sealing means between said walls and said ribs so that said injector is disposed in a sealed compartment.

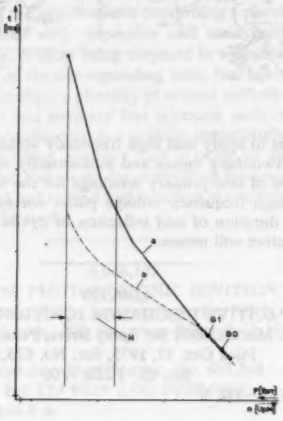
4,046,129

REGULATING ARRANGEMENT FOR INTERNAL COMBUSTION ENGINES, ESPECIALLY THOSE WITH A FUEL INJECTION SYSTEM

Erhard Bigalke; Jürgen Wolf, both of Wolfsburg, and Günther Schmelzer, Klein-Schoppenstedt, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Continuation of Ser. No. 398,836, Sept. 19, 1973, abandoned, which is a continuation of Ser. No. 116,958, Feb. 19, 1971, abandoned. This application Mar. 16, 1976, Ser. No. 667,296
Claims priority, application Germany, Feb. 20, 1970, 2007855
Int. Cl.² F02D *1/04*
U.S. Cl. 123—32 EA **12 Claims**

1. In a device for regulating an internal combustion engine in which the variation of engine torque with respect to a controlled variable of the engine defines an engine torque curve which rises to a maximum and then decreases therefrom, including means operative under partial and full engine load operation for regulating the controlled variable in response to change in the suction pipe pressure of the engine and in accordance with a predetermined regulating relationship defining a first characteristic line, the improvement comprising means, operative during engine idling operation only, for modifying



said first characteristic line into a second characteristic line at least a portion of which is of lesser slope than said first characteristic line, said second characteristic line having at least a point in common with said first characteristic line and having a porton which exhibits lower values than said first characteristic line such that the values of the controlled variable produced by the regulating means in response to operational disturbance variables during idling always lie in the rising portion of said engine torque curve.

4,046,130

TARGET PRACTICE ATTACHMENT FOR A FIREARM

George Najarian, 1956 Brown St., Brooklyn, N.Y. 11229

Filed Oct. 16, 1975, Ser. No. 615,142
Int. Cl.² F41B *7/00*
U.S. Cl. 124—28 **10 Claims**

1. A target practice device for temporary attachment to a firearm, said firearm having a handle grip at one end, an elongated barrel extending along a longitudinal axis from the handle and terminating in a muzzle, a trigger and a displaceable hammer responsive to the pulling of the trigger for normally firing the firearm, said device comprising:

a. an elongated, tubular cylinder extending along a longitudinal axis and having an open, forward end;

b. mounting means for removably securing said cylinder on the outside surface of the elongated barrel of the firearm

with the longitudinal axis of said cylinder being substantially parallel to the longitudinal axis of the firearm and with the open end of said cylinder being adjacent the muzzle of the firearm;

c. a captive elongated rod slidably mounted permanently contained within said cylinder, said rod having a forward end contained within said cylinder in a cocked position which extends from the said open end in a discharge position; and

d. means movable in response to the pulling of the trigger and the consequent displacement of the hammer for axially displacing said rod along the interior of said cylinder whereby the forward end of said rod emerges from the open end of said cylinder and is thereby adapted to strike a practice target said means including a portion of said rod extending exteriorly of the cylinder to a position so located as to be struck by the hammer of the firearm.

4,046,131

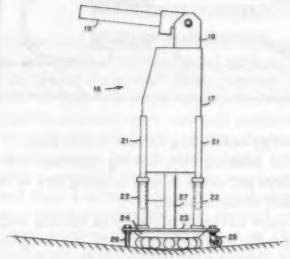
TENNIS BALL COLLECTION, PICK-UP AND PROPELLING SYSTEM

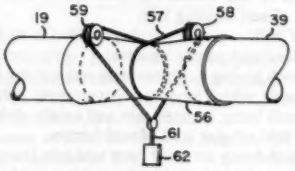
Thomas S. Clark, Palo Alto; William S. Kennedy, San Jose, and Robert L. Piziali, Stanford, all of Calif., assignors to American Tennis Systems, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 386,308, Aug. 7, 1973, abandoned. This application Dec. 15, 1975, Ser. No. 641,080

Int. Cl.[2] F02B *33/10*

U.S. Cl. 124—71 **9 Claims**





4. A tennis ball retrieving and propelling device adapted to be supported on a firm, relatively smooth surface comprising:

a ball delivery tube through which balls can be propelled and, including an inlet and an exit end;

ball loading means having an opening near the surface for receiving and moving said balls individually into the inlet of the delivery tube;

a ball-queuing carrousel mounted on the device adjacent the supporting surface for rotation past the ball loading means for supplying one ball at a time thereto;

a ball release mechanism at the exit end for releasably constricting the effective internal area of the delivery tube and preventing passage of a tennis ball therethrough;

pneumatic means for creating a high air pressure between the inlet end and the ball release mechanism; and

means for releasing the ball release mechanism and allowing the ball to be propelled through the tube exit end under force of the high air pressure.

4,046,132

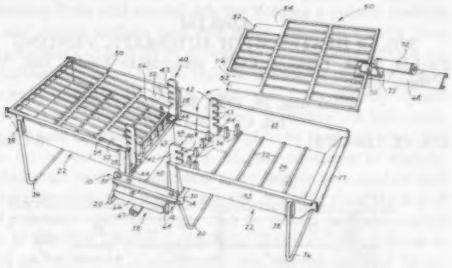
SELF EXTINGUISHING, PORTABLE COOKING UNIT HAVING FOLDING FUEL TRAYS

Charles R. White, Sidney, Canada, assignor to Newco Fireplace Equipment Limited, Inc., Portland, Oreg.

Filed Nov. 10, 1975, Ser. No. 630,611

Int. Cl.[2] F24C *1/16*; A47J *37/00*; F24B *3/00*

U.S. Cl. 126—9 R **22 Claims**



17. A solid fuel stove comprising in combination a base, a pair of fire pan means pivotally supported on the base and swingable between an open-face-to-open-face fuel-ignition-chamber-forming-relation and an end-to-end aligned open-face-up burning fuel holding relation, upper portions of the fire pan means in fuel-ignition-chamber-forming-relation forming an upright hollow enclosure having an upper open-mouth, there being air inlet means provided in the lower portions of each of fire pan means in fuel-ignition-chamber-forming-relation to permit entry of air into the enclosure.

4,046,133

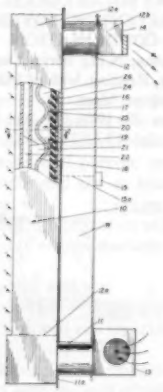
SOLAR PANEL ASSEMBLY FOR FLUID HEATING AND METHOD

Thomas E. Cook, 3570 Maize Road, Columbus, Ohio 43224

Filed Mar. 10, 1976, Ser. No. 665,423

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—270 **6 Claims**



1. A solar-heating panel assembly comprising a ray-absorbing inner panel and a ray-passing outer panel spaced outwardly therefrom to provide a fluid passageway therebetween through which the fluid to be heated is passed, said panels being formed relatively to provide successive restricted slots and expansion pockets along the passageway in the direction of and transversely of the flow of the fluid to be heated, and inlet and outlet means for said passageway to produce and flow; said

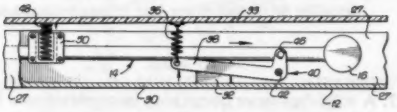
ray-passing panel being of corrugated diaphanous material with its corrugations extending transversely to provide alternating Venturi-like slots and expansion pockets transversely of the flow of fluid through the passageway, said inner panel being of black material and having ribs on its surface which extend longitudinally of the passageway and substantially at right angles to said corrugations of the ray-passing panel.

4,046,134

SOLAR HEATER WITH AUTOMATIC VENTING

Paul B. Scott, Topanga, Calif., assignor to Xonics, Inc., Van Nuys, Calif.

Filed Aug. 26, 1976, Ser. No. 717,607
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 **8 Claims**



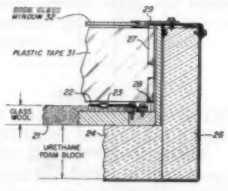
1. A solar heat collector having in combination:
a solar absorbing heat exchanger for exposure to solar radiation;
a housing enclosing said exchanger and having a movable wall portion of a material transparent to solar radiation;
means for the support for said exchanger within said housing,
said support means permitting heat induced expansion of a portion of said exchanger in respect to said housing;
means fixing a portion of said exchanger to said housing to prevent movement is respect thereto; and
means responsive to heat induced expansion and contraction of said exchanger for separation of said movable wall from said housing,
whereby to permit ambient air to circulate within said housing with resultant cooling of said exchanger.

4,046,135

HIGHLY EFFICIENT SOLAR COLLECTOR INCLUDING MEANS FOR PREVENTING COVER PLATE FLUID CONDENSATION

Ernest F. Root, Nashua, N.H.; Serge Kunica, Wellesley, and Harry M. Simmons, Reading, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed Jan. 30, 1976, Ser. No. 653,819
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **4 Claims**



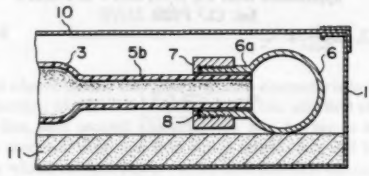
1. A solar energy collector comprising:
a. a heat trap member having cells therein of polyethylene terephthalate for preventing radiation losses, and convection currents from being produced in said cells, and yet permitting very high transmittance of solar radiation into said collector;
b. a window for covering said heat trap member, said window having high solar energy transmissivity while concurrently filtering out ultraviolet radiation;
c. a heat absorption member positioned under said heat trap member for absorbing said solar radiation;
d. a first heat insulating layer positioned under said heat absorption member; and
e. a second heat insulating layer made of polyurethane foam positioned under said first heat insulating layer, said second insulating layer having characteristics which cause said second insulating layer to produce vapor capable of producing condensation on the inside surface of said window should said second insulating layer assume a temperature exceeding a given temperature level, said first heat insulating layer being capable of preventing said second heat insulating layer from assuming a temperature higher than said given temperature level.

4,046,136

SOLAR ENERGY COLLECTING DEVICE

Takichiro Izumi, Yuki; Shigeo Chiba, and Kazumitsu Kobayashi, both of Shimodate, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed Apr. 5, 1976, Ser. No. 673,489
Claims priority, application Japan, May 26, 1975, 50-70762[U]; May 26, 1975, 50-70763[U]
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **4 Claims**



1. A solar energy collecting device comprising:
a relatively flat housing box, having opposite side walls;
a pair of headers provided in said housing box to be substantially parallel to each other;
said headers each having a plurality of tubular studs extending substantially perpendicularly to the longitudinal axis thereof and a plurality of bellows portions arranged therealong;
opposite ends of said headers project out of said opposite side walls of said housing box;
a plurality of hollow plastic panels provided in said housing box to bridge said pair of headers;
said panels each having a substantially rectangular body and opposite ends which converge to provide tubular end portions each being inserted into and axially slidably supported by said tubular stud of said header;
union nuts each being screwed onto said tubular stud while said tubular end portion of said panel is passed through a central opening of said union;
annular elastic sealing elements each being fastened between said union nut and the end of said tubular stud; and
means to fix an end portion of each of said panels to said housing.

4,046,137

SOLENOID OPERATED BLOOD PUMP DRIVE SYSTEM

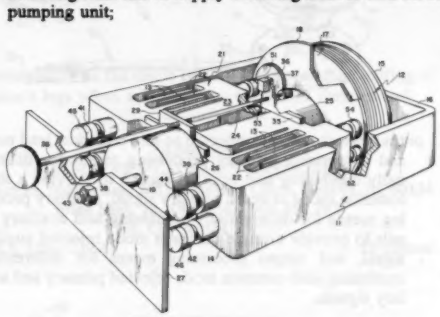
Richard W. Curless, Nabnasset, and Armando Federico, Needham, both of Mass., assignors to Avco Corporation, Greenwich, Conn.

Filed Aug. 11, 1976, Ser. No. 713,546
Int. Cl.² A61M 1/03; F04B 9/10
U.S. Cl. 128—1 D **15 Claims**

1. In a system for assisting and/or providing blood flow in a living body comprising a blood pumping unit, a source of actuating fluid, and means for providing a synchronizing trigger signal for synchronizing the operation of said blood pump-

ing unit with the pumping action of the heart, an actuating unit for periodically supply operating fluid to actuate said blood pumping unit to produce an augmented stroke in synchronism with the diastolic period of the pumping action of the heart comprising:

a. a rigid frame member having an opening therein;
b. a carriage member movably disposed within said frame member opening;
c. a first solenoid carried by said frame member;
d. a second solenoid carried by said carriage member and oppositely disposed to said first solenoid;
e. bellows means carried by said frame member, said bellows means being adapted for connection to said source of actuating fluid and to supply actuating fluid to said blood pumping unit;



f. first and second movable plate members rigidly interconnected and operatively associated with said solenoids and bellows means whereby when current is sequentially supplied to said solenoids, said plates are magnetically attracted by said solenoids and said bellows mens ae actuated to vary the volumetric content thereof; and
g. means adapted to be actuated by said trigger signal for applying a series of two voltages comprising a first voltage and then a second lower voltage alternately to said first and second solenoids, said second voltage in each case being applied upon termination of said first voltage whereby upon actuation by said trigger signal, said augmented stroke is produced in synchronism with the diastolic period of the pumping action of the heart.

4,046,138

DIAGNOSTIC DEVICE FOR LIQUID SAMPLES

Gary Libman, Des Plaines; William J. Binard, McHenry, and Harish A. Patel, Oak Park, all of Ill., assignors to The Kendall Company, Boston, Mass.

Continuation of Ser. No. 495,977, Aug. 29, 1974, abandoned.
This application Feb. 23, 1976, Ser. No. 660,529
Int. Cl.[2] A61B *10/00*
U.S. Cl. 128—2 F **2 Claims**

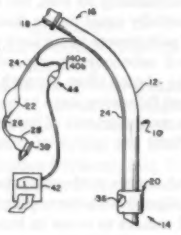
1. A diagnostic device for use with a sample of body fluid, said diagnostic device comprising a four-piece separable container including a cylindrical sidewall and open top and a closed bottom forming a receptacle, a first lid having a first side and a second side detachably secured to the top of said container, a second lid detachably secured to the bottom of said container, a cover detachably secured over the first side of said first lid, said first lid having an inner planar surface having upstanding annular ring and upstanding spaced prongs both extending from said second side for holding a culture medium on said planar surface, said ring being spaced inwardly from the periphery of said lid to provide an annular area around the circumference of said lid to receive the top of said cylindrical sidewall, said first lid being removable from the top of said container in order for the containers to receive the body sample and said container being adapted to be inverted when the first lid is secured to the top of said container to thereby contact said medium with said body sample to inoculate said culture medium, said first lid may be removed from the top of said container and said cover may be placed over the second side of said first lid after inoculation of said culture medium to form an incubation package and said second lid may be removed from the bottom of said container and secured to the top of said container to use said sample for further analysis.

4,046,139

MEDICAL TEMPERATURE MEASURING DEVICE

Bernard Horn, 7742 Terrace Drive, El Cerrito, Calif. 94530

Filed Aug. 23, 1976, Ser. No. 716,657
Int. Cl.[2] A61B *5/00*; A61M *25/00*
U.S. Cl. 128—2 H **2 Claims**



1. A medical temperature measuring device comprising
means defining a pliant flexible tube adapted to enter the trachea and permit respiratory function to continue, said tube having a tube wall portion, means defining an air channel, an exterior end and an interior end adapted to enter the trachea,
an inflatable cuff disposed proximate said interior end of said tube and adapted to engage the wall of the trachea when inflated,
means for inflating said cuff,
means defining a conduit connected to said tube in fluid communication with said cuff and said means for inflating said cuff,
1 a temperature sensor disposed on said cuff and adapted to be in thermal contact with the wall of said trachea when said cuff is inflated,
means for thermally insulating said temperature sensor from said air channel, said means for thermally insulating said temperature sensor disposed between said sensor and said air channel,
means for measuring temperature detected by said temperature sensor, and
means for operatively connecting said temperature sensor to said means for measuring temperature.

4,046,140

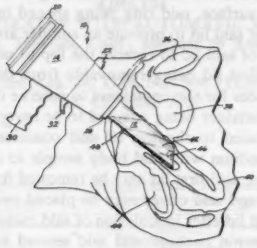
CERVIX PHOTOGRAPHIC METHOD

Grant R. Born, 5180 Kalamazoo, SE., Grand Rapids, Mich. 49508

Division of Ser. No. 259,088, June 2, 1972, abandoned. This application Dec. 11, 1975, Ser. No. 639,854

Int. Cl.[2] A61B *1/00*

U.S. Cl. 128—2 R **3 Claims**



1. The method of photographing the cervix and using the photos so obtained for diagnostic and treatment purposes comprising the steps of:

providing an elongated, hollow, open-ended tubular member having a preselected length formed from transparent material;

inserting the member through the vaginal opening thereby dialating the walls thereof;

continuing the inserting step until the inner open end of the member surrounds the cervix;

providing a close-up, fixed focus camera having an annular flashlamp surrounding its lens, the diameter of said lamp being substantially equal to the diameter of said member, the focus of said camera being such as to produce a predetermined and subsequently reproducible subject-image ratio enabling photos taken through utilization of this, the preceding and following steps to be used for accurate and comparative measurements of lesions and other abnormalities throughout the course of treatment of a particular patient;

positioning said camera so that said flashlamp is in abutment and axially aligned with the exposed end of said member;

triggering said camera to cause its lens to open and its flashlamp to momentarily illuminate;

transmitting the illumination from said flashlamp along the sidewalls of said member and thereby concentrating the light from the flashlamp at the area immediately surrounding the cervix to expose the film;

removing the camera from abutment with the member removing the member and developing the film so exposed; and

using the photo so obtained for diagnostic and treatment purposes.

4,046,141

METHOD AND APPARATUS FOR INTERFACING TO ANATOMIC SIGNAL SOURCES

Carlo J. DeLuca, Newton, Mass., assignor to Liberty Mutual Insurance Company, Boston, Mass.

Filed July 14, 1975, Ser. No. 595,582

Int. Cl.[2] A61B *5/04*

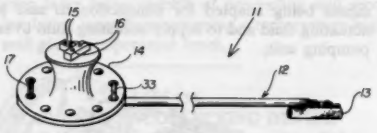
U.S. Cl. 128—2.1 R **11 Claims**

1. An electrical system for interfacing to anatomic signal sources and comprising:

primary terminal means comprising a pair of spaced apart primary terminals for anatomic implantation, said primary terminals being electrically isolated from each other so as to receive a pair of primary signals generated physiologically, said primary signals comprising both a desired component derived from a primary tissue source and a noise component derived from an auxiliary tissue source;

auxiliary terminal means comprising a pair of spaced apart auxiliary terminals for anatomic implantation directly adjacent to said primary terminal means, said auxiliary terminals being electrically isolated from each other so as to receive a pair of auxiliary signals generated physiologically and derived from said auxiliary tissue source;

electrical lead means for anatomic implantation and connected to receive said primary and auxiliary signals; and



output circuit means connected to said electrical lead means and comprising primary processing means for differentially combining said primary signals to provide a single common mode rejected primary signal, auxiliary processing means for differentially combining said auxiliary signals to provide a single common mode rejected auxiliary signal, and output processing means for differentially combining said common mode rejected primary and auxiliary signals.

4,046,142

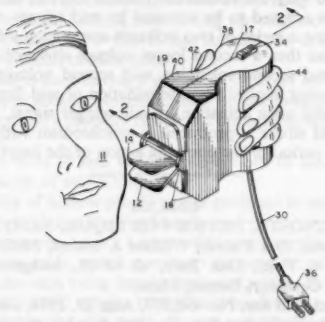
BEAUTY PADDLE

Dorothy Whitney, 1200 N. 33, Renton, Wash. 98055

Filed Apr. 9, 1976, Ser. No. 675,574

Int. Cl.[2] A61H *23/00*

U.S. Cl. 128—55 **6 Claims**



1. A hand held beauty paddle for the stimulation of the skin and blood circulation comprising a rotatable multiple bladed paddle mounted to a housing having a contour with protuberances and hollows for easy manual retention and split into two parts and provided with electric motor driving means for the paddle via a power transmission belt twisted through an angle such as 90°.

4,046,143

HEART PATIENT AID

Lawrence D. Bell, Hermitage Garden Apartments, Apt. C-204, Old Hickory, Tenn. 37138

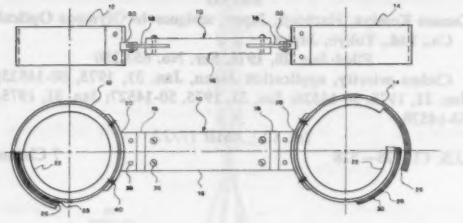
Filed June 4, 1976, Ser. No. 692,794

Int. Cl.[2] A61F *13/00*

U.S. Cl. 128—133 **10 Claims**

1. An article for holding legs of a heart patient apart near the ankles and preventing crossing of same comprising two circular members each having overlapping ends adapted to be

pulled open outward upon exertion of slight force, said members being joined together by a connecting bar and having an



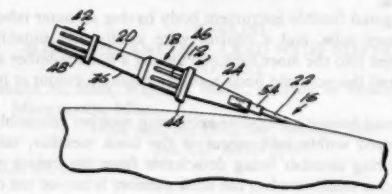
insulating layer on the inside thereof for preventing chaffing of a person's legs when said members are closed therearound.

4,046,144

CATHETER PLACEMENT ASSEMBLY

Richard H. McFarlane, 2571 Kaneville Court, Geneva, Ill. 60134

Filed Sept. 18, 1975, Ser. No. 614,707
Int. Cl.[2] A61M *25/00*
U.S. Cl. 128—214.4 **12 Claims**



1. An improved catheter comprising, an axially aligned combination of

a hollow, rigid, elongate needle with a pointed distal end and a proximal end zone, and

a hub of rigid plastic material with a central zone secured about the proximal end zone of the needle,

said central hub zone having a distally-extending generally cylindrical skirt spaced from said needle defining an annular, distally opening, axially extending chamber with an exterior surface and said hub including an annular shoulder intermediate the end zones and forming a partial annular end wall of the chamber, and

said central hub zone having a proximally extending tubular wall defining a proximally opening flash chamber, the proximal end zone of said needle being in fluid communication with said flash chamber, and

a vented removable cap closing said flash chamber,

said distally opening chamber defining a mouth of said chamber in said hub with said hub being provided with rim means extending outwardly of said mouth and said rim means and exterior surface providing means to facilitate axial movement of advancement of the needle in a distal direction,

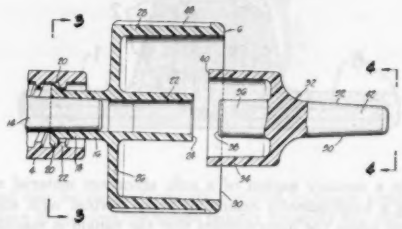
said improved catheter including a thin, flexible elongate jacket having a proximal end and a distal end snugly jacketing the needle from the zone of the pointed distal end along the intermediate length of the needle and including a rigid adapter having a first end zone and a second end and means fixedly connecting the first end zone of the adapter to the jacket, said adapter being sized for snug receipt within said skirt protectively within said chamber with said second end normally in abutting engagement with the end wall of said chamber.

4,046,145

SYRINGE CONNECTOR

Pradip Vinobchandra Choksi, Northridge, and Walter Seemayer, Burbank, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed June 29, 1976, Ser. No. 700,902
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—215 **18 Claims**



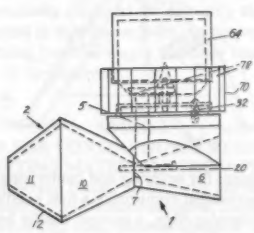
1. A connector for transfer of medical fluids comprising: a tubular coupler having an outer surface and including a front attaching means and a rear attaching means; a protector housing secured to the coupler, said housing having a collar with an inner surface which is spaced radially outward from the coupler, and the collar extends beyond a forward end of the front attaching means to protect it from contamination; and said protector housing including a spacer means fixedly connected to both the collar and tubular adapter to maintain the spacial relationship between the collar and tubular coupler.

4,046,146

APPARATUS FOR THE INHALATION OF MEDICINAL AGENTS

Gunter Rosskamp; Reiner Kolberg; Peter Gunzel, and Hans-Jurgen Porep, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Aug. 21, 1975, Ser. No. 606,737
Claims priority, application Germany, Aug. 22, 1974, 2440623; June 2, 1975, 2524902; June 30, 1975, 2529522
Int. Cl.[2] A61M *15/00*
U.S. Cl. 128—266 **15 Claims**



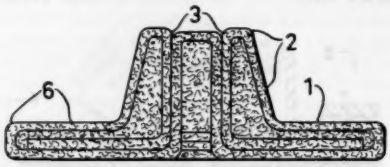
1. Apparatus for the inhalation of medicinal agents in pulverulent form, comprising a housing having a venturi tube-shaped interior configuration including a diffuser zone and provided with an aerosol exhaust section; said housing including a dispensing opening having a delivery end which terminates upstream of the diffuser zone of the venturi-like housing, a container for the medicinal agent, means mounting said container on said housing for dispensing of the medicinal agent to said dispensing opening, and a collecting plate adjacent the delivery end of said dispensing opening and disposed longitudinally and transversely in close proximity to the venturi tube-shaped interior configuration of the housing.

4,046,147

SANITARY NAPKIN

Cecilia Berg, 26A S. Fogdelyckeg, Karlshamn, Sweden (S-292 00)

Filed Aug. 5, 1976, Ser. No. 712,117
Int. Cl.[2] A61F *13/16, 13/20*
U.S. Cl. 128—290 R **4 Claims**



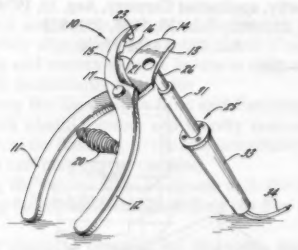
1. In a sanitary napkin of a soft, absorbent material and having a longitudinally extending hump portion with softly rounded edges the improvement that the napkin is manufactured of a single blank, that said hump portion if formed partly by folding opposite end portions of the blank to form in cross section an L-shape and partly by folding the middle portion of the blank to form a U-shape having its opening facing away from said hump portion, said U-shape fold being disposed between both L-shaped folds so as to define in the hump two spaced slits extending longitudinally of the napkin, said slits separating ridges cresting the hump shaped by the folded portions.

4,046,148

SEVERING AND CAUTERIZING INSTRUMENT FOR USE IN SEVERING TAILS AND NAVEL CORDS

Lawrence Dean Meador, R.R. 2, Lanark, Ill. 61046

Continuation of Ser. No. 565,448, April 7, 1975, abandoned. This application Jan. 24, 1977, Ser. No. 761,771
Int. Cl.[2] A61B *17/32, 17/36*
U.S. Cl. 128—303.1 **5 Claims**



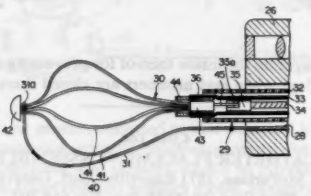
1. An instrument for severing and cauterizing an appendage of a pig, said instrument comprising a first handle having a first blade with a concave edge, a second handle having a second blade with a convex edge, means pivotally connecting said first handle and said first blade with said second handle and said second blade and enabling said blades to scissor across one another when said handles are squeezed toward one another, a notch formed in the edge of one of said blades for receiving an appendage of a pig and coacting with the edge of the other blade to sever the appendage when said blades are scissored across one another, an electric heating element connected to one face of one blade and operable to heat the latter blade whereby the appendage is cauterized as an incident to being severed, and a handle connected to said heating element and disposed at an angle relative to said first and second handles whereby the three handles define a tripod for supporting said instrument in a standing position.

4,046,149

INSTRUMENT FOR REMOVING A FOREIGN SUBSTANCE FROM THE BODY CAVITY OF HUMAN BEING

Osamu Komiya, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 28, 1976, Ser. No. 653,150
Claims priority, application Japan, Jan. 31, 1975, 50-14525; Jan. 31, 1975, 50-14526; Jan. 31, 1975, 50-14527; Jan. 31, 1975, 50-14528
Int. Cl.[2] A61B *17/22*
U.S. Cl. 128—328 **7 Claims**



1. An instrument inserted through a channel of an endoscope for trapping a foreign substance, such as a polyp or stone, and removing it outside of the body cavity of a human being, comprising:

an elongated flexible instrument body having an outer tube, an inner tube, and a control wire axially and slidably inserted into the inner tube and having a hook member at one end thereof, said hook member having a cutout at its side;

trap means having a loop-like anchoring member releasably anchored within said cutout of the hook member, said anchoring member being detachable from the cutout of the hook member when the hook member is moved out of the inner tube, thereby releasing the trap means from the instrument body;

a ring member slidably moved and fitted over the trap means for squeezing the same; and

a supporting wire one end of which supports the trap means released from the instrument body, the other end of which passes through the channel of the endoscope and extends outside thereof.

4,046,150

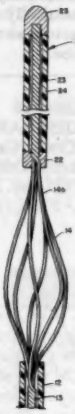
MEDICAL INSTRUMENT FOR LOCATING AND REMOVING OCCLUSIVE OBJECTS

Robert S. Schwartz, Boulder, and Ronald R. Pfister, Littleton, both of Colo., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed July 17, 1975, Ser. No. 596,811
Int. Cl.[2] A61B *17/22*
U.S. Cl. 128—328 **14 Claims**

8. An instrument for use in locating occlusive objects in body passages and removing the same therefrom, comprising a transparent flexible sheath having proximal and distal ends and having a passage extending longitudinally therethrough; a flexible cable composed of a plurality of wires extending uninterruptedly from one end of said cable to the other; said cable being slidably disposed in said passage of said sheath and having a length greater than said sheath; said cable including an integral cage portion slidable between a first position wherein said cage portion is collapsed and retracted within said passage at the distal end of said sheath and a second position wherein said cage portion is expanded, extended, and exposed beyond the sheath's distal end; and handle means connected to said

cable at the proximal end of said sheath for selectively shifting said cage portion between its first and second positions; said

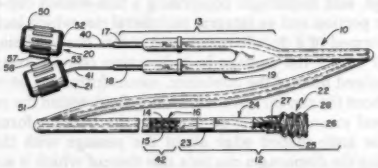


wires being twisted tightly together between said handle means and said cage portion.

4,046,151
BODY IMPLANTABLE LEAD WITH STIFFENING STYLET

Maria M. Rose, Wayzata, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Apr. 30, 1976, Ser. No. 682,506
Int. Cl.[2] A61N *1/04*
U.S. Cl. 128—404 **15 Claims**



12. A body implantable lead of material substantially inert to body fluids and tissue having a length of electrically insulated, flexible conductor, an electrode adapted to contact the tissue of a living animal body at the distal end of the conductor, and a lumen extending the length of insulated conductor, said lead further comprising:

stylet wire means for insertion into said lumen for stiffening said electrical conductor, said stylet wire means having a length exceeding the length of said lumen; and

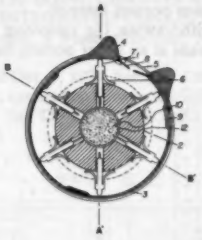
means coupled to said stylet wire means for engaging with said lead and holding at least a portion of the excess length of said stylet wire means in said lumen for increasing the tension on said lead.

4,046,152
CIGAR-CIGARETTE PERFORATING DEVICES

Jac Eduard Purdon, 16934 Village Lane, Grosse Pointe, Mich. 48230

Filed Sept. 13, 1976, Ser. No. 722,782
Int. Cl.[2] A24F *13/00*
U.S. Cl. 131—170 R **2 Claims**

1. A device for perforating the paper wrapper of a tubular smoking item, comprising several spring biased, longitudinally movable, perforating means radially situated under tension in a mounting means; said mounting means having a centrally located opening for receiving a smoking item; said perforating means being held in position by a circumferential spring loaded band means, which is in turn held in position by an outer housing, whereby the circular shape of said circumferential

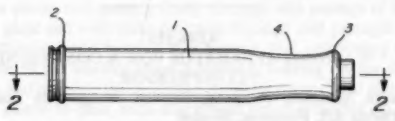


band may be circumferentially reduced by finger pressure to reduce the perforating means radially inwardly into said opening.

4,046,153
CIGARETTE HOLDER

Paul Kaye, Farmington Hills, Mich., assignor to Aquafilter Corporation, Farmington Hills, Mich.

Filed Mar. 1, 1976, Ser. No. 662,565
Int. Cl.[2] A24F *13/62*
U.S. Cl. 131—187 **13 Claims**



1. A cigarette holder construction having a casing with a mouthpiece and a cigarette receiving end,

a sleeve insert cigarette receiving end,

said sleeve comprising an annular wall having an inner surface and an outer surface, said outer surface having at least a portion thereof frictionally engaging the cigarette receiving end of the casing, and said inner surface having a plurality of rigid inwardly extending projections spacedly circumferentially disposed for engaging the tip of a cigarette inserted in said sleeve with the projections subscribing a circular locus having a diameter less than an outer diameter of the cigarette.

4,046,154
APPARATUS FOR CONTINUOUSLY REMOVING FILM COATING MATERIALS FROM FILM

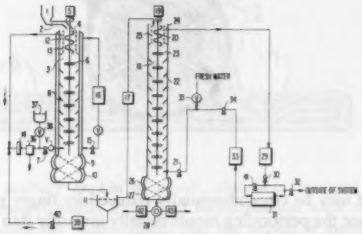
Sugihiko Tada; Setsuo Nakai; Kazuo Irie; Hirokazu Saito, and Hideaki Suzuki, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 450,516, March 12, 1974, abandoned.
This application Feb. 3, 1976, Ser. No. 654,829
Claims priority, application Japan, Mar. 12, 1973, 48-28707
Int. Cl.[2] B08B *3/08*
U.S. Cl. 134—65 **2 Claims**

1. An apparatus for continuously removing a coating material on film chips comprising:

a. contacting means of a generally cylindrical shape for containing a removing liquid and including a rotatable shaft, said shaft having at least one screw and a plurality of stirring vanes, and said contacting means having a plurality of baffle plates attached to the inner wall of said contacting means and angled downwardly to urge film chips down said contacting means;

b. means for feeding film chips to an upper portion of said contacting means;
c. means for discharging said film chips from a lower portion of said contacting means;
d. means for feeding a removing liquid to said contacting means at a lower portion thereof;
e. means for withdrawing the removing liquid from said contacting means at an upper portion thereof;



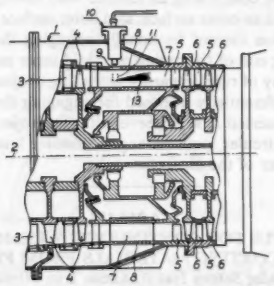
f. means for discharging a portion of the removing liquid to outside said apparatus;
g. means for supplying a fresh removing liquid to the remaining withdrawn removing liquid;
h. means for separating removing liquid from said discharged film chips; and
i. means coupled to the means of (e), (g) and (h) for feeding the removing liquid containing the fresh removing liquid to the feeding means of (d).

4,046,155

WASHING APPARATUS FOR A COMPOUND COMPRESSOR

Martin Mansson, Finspong, Sweden, assignor to Stal-Laval Turbin AB, Finspong, Sweden

Filed Dec. 18, 1975, Ser. No. 642,110
Claims priority, application Sweden, Dec. 30, 1974, 7416342
Int. Cl.[2] B08B *3/02, 9/00*
U.S. Cl. 134—167 R **1 Claim**



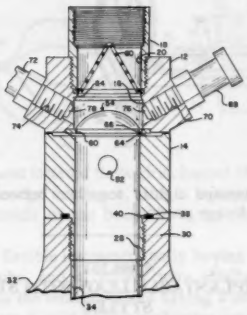
1. Washing apparatus for a compound compressor of the type comprising a generally annular casing, at least one low pressure compressor, at least one high pressure compressor and at least one connecting channel therebetween, comprising:
a spray tube having a fluid inlet through which washing fluid is admitted under pressure at the time of a washing operation;
means for mounting said spray tube on said compound compressor externally of said casing and radially opposite an aperture defined in said casing, said aperture being so positioned along the axial length of said compound compressor that said aperture opens into said at least one connecting channel; and
means actuated by washing fluid pressure at said spray tube inlet for moving said spray tube radially inwardly through said aperture,
whereby said spray tube is normally positioned externally of said casing but is automatically moved inwardly of said casing through said aperture as washing fluid pressure is applied to said spray tube.

4,046,156

EXPLOSION DISCHARGE VALVE

Kenneth C. Cook, Walnut Creek, Calif., assignor to Systron-Donner Corporation, Berkeley, Calif.

Filed Dec. 4, 1975, Ser. No. 637,582
Int. Cl.[2] F16K *17/40*
U.S. Cl. 137—68 A **4 Claims**



1. A valve for discharging pressurized fire extinguisher fluid from a container, including the combination of a valve housing formed with a passage communicating with the interior of the container, a diaphragm mounted in the housing across the passage, said diaphragm comprising a thin-walled cup-shaped center portion and an integral peripheral rim which includes a ring formed of a ductile metal, said center portion being positioned within the passage in a direction convex away from pressurized fluid of the container, means forming a hermetical seal about the rim for normally sealing fluid within the passage, said seal means comprising means in the housing forming an annular knife-shaped edge about the passage with the edge abutting the diaphragm rim on a side thereof which is normally exposed to pressurized fluid in the passage from the container, the housing including means for releasably urging the ring against the knife-shaped edge whereby the edge forms and seats into an annular groove in the metal of the ring and whereby the ring can be released for moving and replacing the diaphragm, and explosive charge means oriented toward the diaphragm center portion on the convex side thereof for rupturing the diaphragm and permitting discharge of fluid from the container along the passage.

4,046,157

ELECTRICAL CONTROL FOR INFLATING VALVE FOR CONTAINERS FOR COMPRESSED LIQUEFIED OR DISSOLVED GAS

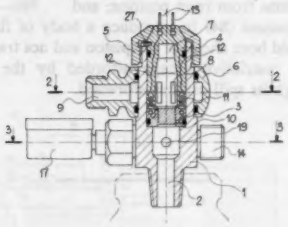
Jean Michel Cazalaa, 49 Av du Onze Novembre, 92190 Meudon; Alexandre Jean-Paul Barthe, 58 rue J.B. Baudin App. 14, 94800 Ville Juif, and André Robert Derrien, La Porte au Brun, 91160 Ballainvilliers, all of France

Filed Nov. 4, 1975, Ser. No. 628,767
Claims priority, application France, Nov. 5, 1974, 74.36744
Int. Cl.[2] F16K *17/40, 31/40*
U.S. Cl. 137—74 **3 Claims**

1. An electrical control device for an inflating valve comprising a cylindrical hollow passage for being connected with a container of gas under pressure, said device comprising:
a substantially cylindrical plug made of a fusible material in said passage for blocking and sealing same;

an electrical resistor embedded in said plug and wound in the shape of a cylinder having a longitudinal axis substantially parallel to the axis of the plug and a height substantially equal to the height of the plug;

an electrical source; and



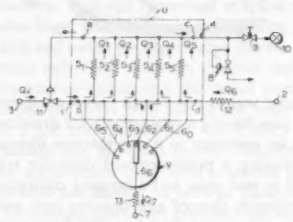
means for selectively connecting said electrical source with said resistor for heating and weakening locally the fusible material of said fusible plug at the level of the windings of the cylindrically wound resistor in order that a central portion of said fusible plug corresponding to the cylinder of said windings is separated from the rest of the plug and expelled under the pressure of the gas in said container.

4,046,158

APPARATUS FOR DILUTING GAS

Osamu Hayashi; Takahumi Inagaki, both of Kyoto, and Yoshio Yanagita, Otu, all of Japan, assignors to Standard Technology, Inc., Kyoto, Japan

Filed Aug. 27, 1976, Ser. No. 718,317
Claims priority, application Japan, Jan. 30, 1976, 51-9792
Int. Cl.² F16K *19/00*
U.S. Cl. 137—88 **4 Claims**



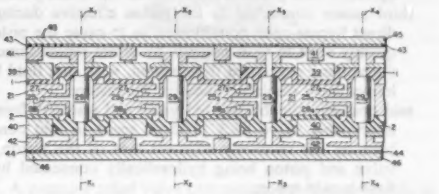
1. An apparatus for diluting gas comprising a primary passage having at opposite ends an inlet for a component gas and an inlet for a diluent gas, a secondary passage for collecting the mixture of the component gas and the diluent gas, a plurality of gas pressure reducing tubes each having the same structure for reducing the pressure of gas flowing therethrough by the same amount and which are connected in parallel between said primary passage and said secondary passage, an exhaust outlet, a changeover device connected to said exhaust outlet, a plurality of exhaust passages each having one end connected with said change-over device, one exhaust passage having the other end connected to said primary passage between one inlet and the next adjacent pressure reducing tube, another exhaust passage having the other end connected to said primary passage between the other inlet and the next adjacent pressure reducing tube, and the remaining exhaust passages having their other ends connected to said primary passage between respective pairs of pressure reducing tubes, a pressure control device connected to said secondary passage for making the pressure of the mixed gas in the said secondary passage a definite pressure, and a pressure difference control device connected between said primary and secondary passages for making the pressure difference between the said primary passage and the secondary passage a definite constant value.

4,046,159

PNEUMATIC LOGIC CIRCUITS AND THEIR INTEGRATED CIRCUITS

Jean-Pierre Pégourié, 3 Passage Bruyas, 34000 Montpellier, France

Filed Oct. 7, 1975, Ser. No. 620,257
Claims priority, application France, Oct. 8, 1974, 74.33822
Int. Cl.² F15C *1/10, 1/12*
U.S. Cl. 137—112 **11 Claims**



1. Pneumatic logic circuit of generally symmetrical structure around an axis and symmetrical with respect to a medium plane normal to this axis, comprising a median plate provided with an axial passage and with a duct opening into this passage, comprising on each side of the median plane a diaphragm made of a flat sheet of elastomer with, on its outer surface, a centering shoulder and with an axial cylindrical passage, comprising axially a piston rod, passing freely through said passage of the median plate and with fluid-tightness through said passages of the diaphragms and bearing two pistons, and comprising on each side of the median plane a bushing, bearing on the diaphragm and capping the centering shoulder thereof and allowing the piston to pass, each diaphragm being provided on its inner surface with an axial impression, comprising at the center a cylindrical chamber, whose diameter is a little greater than the diameter of said axial passage of the median plate, and a toric groove, separated from said cylindrical chamber by an annular lip with a flat profile capable of bearing against said median plate, and pistons each bearing against the outer surface of the corresponding diaphragm, said logic circuit comprising on each side of the median plane an elastic diaphragm and a base applied against the corresponding bushing, and on each side a duct passing through the median plate and opening into the corresponding toric groove.

4,046,160

TRANSMISSION CLUTCHES WITH SEQUENCE VALVE AND PISTON-CONTROLLED PRESSURE MODULATOR

Joachim Horsch, Lombard, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Feb. 2, 1976, Ser. No. 654,427
Int. Cl.² B60K *41/00*; F16D *25/11*
U.S. Cl. 137—115 **4 Claims**

1. In transmission hydraulic controls mechanism wherein speed and direction clutch systems are provided, both disposed to receive modulated actuating hydraulic fluid, a valve assembly comprising:

a reducing valve disposed to receive actuating main rail hydraulic fluid, said reducing valve having a fluid output wherein the pressure of the fluid at the output is reduced at a range below main rail pressure;

a control piston associated with the reducing valve for increasing the actuating pressure of the fluid at the reducing valve output, with said increase at constant rate;

a valve bore in the assembly common to the valve and piston and coaxially slidably receiving same;

said assembly provided with an internal bypass around the piston including a bypass land and means affording there-

past bypass-blocked and direct bypass-open conditions, and having its opposite ends intersecting the bore at two points disposed hydraulically adjacent the respective opposite ends of the piston;

first means connected hydraulically to said bore effective during the bypass-blocked condition to introduce restricted flow of output fluid between the valve and piston to hydraulically cause relative separative movement therebetween from a reset position of the piston adjacent the valve;

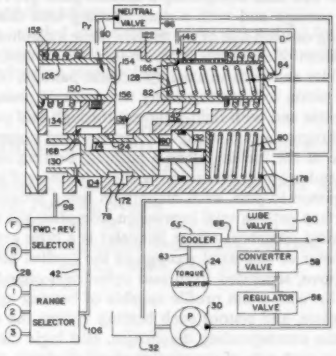
second means effective during the bypass-blocked condition for introducing resistance to relative separative movement by the piston, controlling speed of the latter and building up valve back pressure between the valve and piston; and

third means connected to the piston effective during the direct bypass-open condition so as to cause the piston to quickly reset to reset position by direct replenishment of the volume evacuated therebehind, with that fluid being immediately displaced ahead of the piston;

said coaxially slidably related valve and piston defining an intervening valve back pressure space in said common bore on the relatively adjacent side of the piston, said valve and piston being hydraulically connected by the fluid in said space;

said third means comprising a reset spring (158) connected to the piston on its relatively nonadjacent side.

4. In transmission hyraulic controls mechanism wherein



speed and direction clutch systems are provided, both disposed to receive modulated actuating hydraulic fluid, a valve assembly comprising:

a reducing valve disposed to receive actuating main rail hydraulic fluid, said reducing valve having a fluid output wherein the pressure of the fluid at the output is reduced at a range below main rail pressure;

a control piston associated with the reducing valve for increasing the actuating pressure of the fluid at the reducing valve output, with said increase at constant rate;

a valve bore in the assembly common to the valve and piston and coaxially slidably receiving same:

said assembly provided with an internal bypass around the piston including a bypass land and means affording therepast bypass-blocked and direct bypass-open conditions, and having its opposite ends intersecting the bore at two points disposed hydraulically adjacent the respective opposite ends of the piston;

first means connected hydraulically to said bore effective during the bypass-blocked condition to introduce restricted flow of output fluid between the valve and piston to hydraulically cause relative separative movement therebetween from a reset position of the piston adjacent the valve;

second means effective during the bypass-blocked condition for introducing resistance to relative separative movement by the piston, controlling speed of the latter and building up valve back pressure between the valve and piston, and

comprising a drain port intersecting said bore intermediate said two points so as to lie along the path of sliding of the piston;

said piston having spill orifices (166) of graduated size along the side thereof, having decreasing size as they encounter the drain port during said relative separative movement of the piston from reset position; and

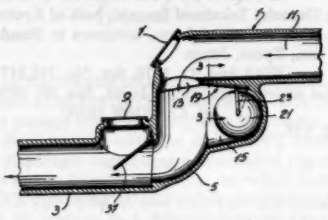
passage means (84) to introduce a body of fluid incoming into said bore ahead of the piston and not trapped because of its restrictive escape afforded by the piston itself through its spill orifices aforesaid.

4,046,161

NON-RETURN VALVE FOR PREVENTING BACK FLOW OF WASTE WATERS

Benoit Bonneau, 470 Roberval St., Roberval, Quebec, Canada

Filed Oct. 31, 1975, Ser. No. 627,910
Claims priority, application Canada, Oct. 29, 1974, 212602
Int. Cl.[2] F16K 9/00
U.S. Cl. 137—247.17 6 Claims



1. A waste waters non-return valve, comprising:

a drain pipe having a passageway for draining waste waters from an upstream to a downstream direction, a circular seat having a predetermined diameter transversely disposed in said pipe, and a housing contiguous to said seat downstream thereof and opening into said passageway, said housing extending laterally from said seat and said passageway and having an upper wall provided with a guiding strip extending transversely with respect to the pipe and being inclined in the upstream direction;

said passageway in the area of said housing being defined by a smooth inner wall portion whereby to prevent retainment along said wall portion of detritus carried by said waste waters;

a shutting ball having a specific gravity lower than the specific gravity of the waste waters and a diameter larger than the diameter of the seat, said housing having a size to completely contain said ball when such is in its inoperative position, whereby said ball does not then inhibit the flow of waste waters through said valve; and

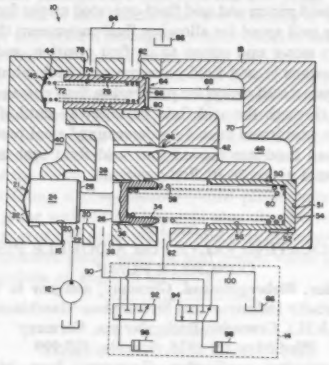
means carried by said shutting ball for slidably connecting said shutting ball with the guiding strip so that the shutting ball can be moved along said guiding strip out of said housing and brought in contact with the seat, in the operative sealing position thereof, by floating on the waste waters in the case of an inopportune upstream back flow. said shutting ball being held back into the housing in an inoperative position by said connecting means and by the waste waters when the waste waters are drained in the downstream direction past said housing.

4,046,162

MODULATION CONTROL VALVE FOR CLUTCHES

Reno Antonio Rodeghiero, Hudson, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 14, 1976, Ser. No. 686,566
Int. Cl.[2] F16K *31/12*; F16D *25/00*
U.S. Cl. 137—489 4 Claims



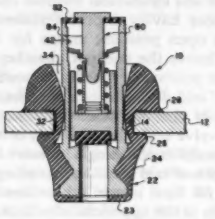
1. A modulation control valve comprising: a valve body having provided therein a modulating valve bore, an accumulator bore concentric with and connected at a first end to the modulating valve bore, and a reservoir valve bore; said valve body having inlet and outlet ports provided therein connected to the modulating valve bore between the ends and having a modulating passageway connecting the outlet port to a first end of the modulating valve bore and to the reservoir valve bore proximate a first end thereof; said valve body having an accumulator passageway provided therein connecting a second end of the accumulator bore with a second end of the reservoir valve bore and having an orificed passageway provided therein connecting the outlet port and the accumulator passageway; said valve body having a first and second reservoir ports provided therein connected to the reservoir valve bore between the ends thereof; a modulating spool slidably positioned in the modulating valve bore movable between a first and second positions wherein fluid communication between the inlet and outlet ports is respectively afforded and blocked; an accumulator piston slidably positioned in the accumulator bore and movable towards and away from the modulating spool; biasing means interposed between the accumulator piston and the modulating spool to urge the modulating spool to afford fluid communication between the inlet and outlet ports when the accumulator and piston is moved towards the modulating spool; and a reservoir valve spool slidably positioned in the reservoir valve bore and movable in response to fluid pressure in the modulating passageway to a first position wherein the modulating passageway is connected to the reservoir valve bore, the reservoir valve bore is blocked from the first reservoir port, and the accumulator passageway is blocked from the second reservoir port and movable in response to fluid pressure in the accumulator passageway to a second position wherein the modulating passageway is blocked from the reservoir valve bore, the reservoir valve bore is connected to the first reservoir port, and the accumulator passageway is connected to the second reservoir port.

4,046,163

RELIEF VALVE

Thomas A. Novak, Durham, N.C., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 610,796, Sept. 5, 1975, abandoned. This application Dec. 8, 1976, Ser. No. 748,618
Int. Cl.[2] F16K *24/04*
U.S. Cl. 137—512.3 16 Claims



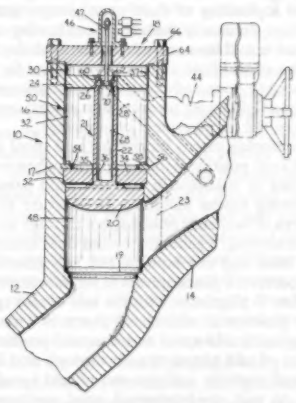
14. A pressure relief valve comprising a body mountable to a pressurized container, said body defining an axially extending passage therethrough having an inlet in fluid communication with the interior of the container and an outlet, said passage having a valve seat intermediate said inlet and said outlet, a poppet slidably mounted in said passage, said poppet having a surface biased to normally contact said valve seat to block the flow of fluid through said passage, and a cover member exterior of and coaxial with the outlet, said cover member generally rigidly mounted to said poppet causing said cover member to move axially therewith and preventing relative axial movement therebetween, said cover member axially spaced from the surface of said poppet designed to contact said valve seat by a distance substantially equal to the separation of said valve seat and said outlet, said cover being formed of resilient material such that said cover member is axially flexible in the regions adjacent the outer periphery thereof.

4,046,164

LIFT CHECK VALVE WITH DASHPOT

Eldert B. Pool, Pittsburgh, Pa., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Oct. 14, 1975, Ser. No. 622,007
Int. Cl.[2] F16K *15/06*
U.S. Cl. 137—514.7 9 Claims



1. An improved check valve of the type having a valve body with a passage therethrough intersected by an operating chamber terminating at the passage with a valve seat and a disc movable in the chamber toward a closed position engaging the

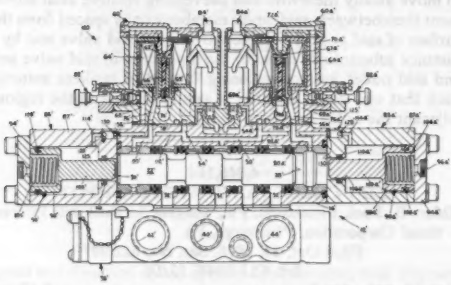
valve seat by fluid flow forces in one direction and an open position spaced therefrom by fluid flow forces in the other direction, the improvement comprising: a cylindrical member connected at one end to the disc and at the other end to a piston having a peripheral surface adjacent the interior surface of the operating chamber and defining thereabove an upper chamber; a baffle plate in the operating chamber axially between said piston and said disc and surrounding said cylindrical member at an axial opening whereby said piston, said baffle means, said interior surface and cylindrical member define therebetween a dashpot chamber having a predetermined volume of liquid therein in the open position; means for limiting the rate at which liquid leaves the dashpot chamber as the disc moves from said open position to the closed position and thereby the closing rate of said disc; and conduit means fluidly communicating the upper chamber with the passage at a location upstream of the valve seat when the flow is in said one direction, said conduit means establishing a pressure balance between the upper chamber and said location providing an upward biasing on the piston for flow in said other direction and preventing fluid conditions in the upper chamber from retarding the closing rate for flow in said one direction whereby the closing rate is prescribed by the rate at which the liquid leaves the dashpot chamber.

4,046,165

VALVE-POSITIONING APPARATUS

Robert C. Rose, Sr., and Harold H. McClelland, both of Akron, Ohio, assignors to IBEC Industries, Inc., New York, N.Y.

Filed June 4, 1975, Ser. No. 583,844
Int. Cl.[2] F15B *13/043*
U.S. Cl. 137—624.27 16 Claims



11. In a spool valve including a housing having a bore therein and a plurality of fluid passageways interconnecting with said bore, an axially shiftable spool having opposite ends and mounted in said bore and adapted to be shifted to open and close various of said fluid passageways, means for axially shifting said spool to open and close said passageways, and means for inserting a fluid under pressure into at least one of said fluid passageways; the improvement comprising:

spool positioning means for shifting said spool to a predetermined axial position within said bore whenever fluid pressure fails or is absent in said one fluid passageway, said positioning means including an aperture axially aligned with one of said ends of said spool through at least one end of said housing; a generally closed fluid chamber mounted on at least said one housing end and generally covering said aperture; a piston mounted for movement in said fluid chamber in alignment with the axis of said spool between a first position in which said piston is withdrawn out of contact with said spool and a second position in which a portion of said piston extends through said housing aperture and contacts said one end of said spool to shift said spool to said predetermined axial position within said bore, the entirety of said piston being located beyond said one end of said spool at all times; sealing means for sealing said piston within said fluid chamber; biasing means for biasing said piston toward its second position; and a fluid passageway connected in fluid communcation with said fluid under pressure in said one fluid passageway for admitting a fluid under pressure against said piston within said chamber whereby whenever fluid pressure is present in said one fluid passageway, said piston is withdrawn to its first position against the force of said biasing means but when the fluid pressure fails or is absent, said piston is moved by said biasing means to its second position to contact said one end of said spool and shift said spool to said predetermined position;

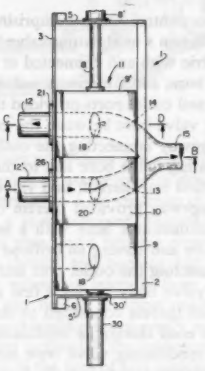
said means for axially shifting said spool being fluid operated; said sealing means including fluid seal means between said piston and said fluid-operated means for axially shifting said spool for allowing fluid movement therepast only to move said piston to its first position, and check valve means in said fluid passageway which admits pressure against said piston for preventing fluid passage to said piston through the said fluid passageway until after said spool is positioned in said predetermined axial position by fluid and fluid has moved past said fluid seal means to move said piston to its first position.

4,046,166

RECIPROCATING VALVE FOR A DOUBLE PISTON CONCRETE PUMP

Horst Bender, Biebergemuend, Germany, assignor to WIBAU (Westdeutsche Industrie- und Strassenbau-Maschinen Gesellschaft m.b.H.), Gruendau-Rothenbergen, Germany

Filed May 13, 1976, Ser. No. 685,999
Claims priority, application Germany, June 14, 1975, 2526767; Dec. 12, 1975, 2555947
Int. Cl.[2] F04B *7/00*; F16K *11/06*
U.S. Cl. 137—625.48 12 Claims



1. A valving apparatus for interconnecting a double piston pump having two cylinders with conveying conduit means and with supply means comprising a valve housing having a given length, said housing further having a first pair of aligned ports for connecting said valve housing to said two pump cylinders, a second pair of aligned ports for connecting the valve housing to conveying conduit means, and a third pair of aligned ports for connecting the valve housing to said supply means, said ports being aligned at a pair of planes extending transverse to the longitudinal axis of said housing with each port of each pair of ports being aligned with a separate one of said planes, a piston valve plug mounted solely for axial movement in said valve housing, said piston valve plug having a central plug section with a cylindrical central passageway extending through the valve plug and the valve housing in a direction to interconnect ports of said first and second pair in a common plane, a first outer plug section with a first outer bent cylindrical passageway and a second outer plug section with a second outer bent cylindrical passageway, said first and second outer

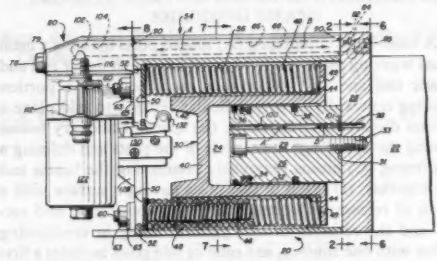
plug sections and said central plug section having together a length shorter than the length of the valve housing to permit the axial displacement of the piston valve plug in said housing, said first and second outer plug sections extending on each side of said central plug section, each of said first and second bent outer passageways including an angle within the range of about 75° to less than 90° in a direction to interconnect ports of said first and third pairs of ports in a common plane, said passageways being axially spaced, whereby in one axial position, said central passageway interconnects one port of said first pair with one port of said second pair, while one of said outer bent passageways interconnects the other of said first pair with one of said second pair, and whereby in another axial position said central passageway interconnects the other ports of said first and second pairs, while the other of said outer passageways interconnects said one of said first pair of ports with the other of said third pair of ports, and means operatively connected to said valve plug for axially moving said valve plug in said valve housing so as to be compatible with the function of suction, pressure and suction in that order for each work cycle of the valve, wherein said valve housing comprises plane walls defining a plug chamber, said piston valve plug also having plane walls fitting into said plug chamber, and wherein at least two of said plane walls of said plug chamber and at least two respective plane walls of said piston valve plug respectively include an angle of up to 75°.

4,046,167

MECHANICAL ACCUMULATOR

Joseph Papp, South Bend, Ind.; Richard A. Meisterheim, Dowagiac, and S. Eugene Hubbard, Niles, both of Mich., assignors to Kawneer Company, Inc., Niles, Mich.

Filed Feb. 6, 1976, Ser. No. 655,724
Int. Cl.² F16L *55/04;* **F01B** *15/02, 31/00*
U.S. Cl. 138—31 **3 Claims**



1. A mechanical accumulator for holding and supplying a volume of fluid under pressure comprising:

a cylindrical hollow casing closed at one end with a fixed end wall and having an inwardly extending annular end wall adjacent an opposite end forming an open end of said casing;

a variable volume fluid pressure chamber formed by a cylindrical piston in coaxial alignment in said casing fixedly secured to said fixed end wall and an annular outer cylinder slidably mounted on said piston for reciprocal movement toward and away from said fixed end wall and closed adjacent an end opposite said fixed end wall,

said cylinder including a plurality of longitudinally extending recesses of substantially circular transverse cross-section positioned adjacent an outer wall surface in parallel, equilaterally spaced relation with respect to a central longitudinal axis of said piston, each of said recesses having a transverse end wall adjacent said fixed end wall of said casing;

a pair of coaxial coil springs mounted in each of said recesses acting in compression between said annular end wall of said casing and the end wall of the recess for biasing said cylinder toward said fixed end wall of said casing to minimize the volume of said pressure chamber;

a fluid conduit in said piston for directing pressurized fluid into and out of said chamber; and

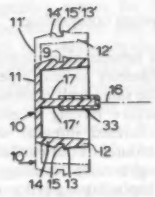
switch means externally of said fluid chamber actuated by movement of said cylinder in response to volume changes of said chamber for controlling the operation of a fluid device in fluid communication with said chamber.

4,046,168

CLOSURE PLUGS

John D. Milne, Islington, Canada, assignor to MM Plastic (Mfg) Company, Inc., Toronto, Canada

Continuation of Ser. No. 539,334, Jan. 8, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 681,044
Claims priority, application Canada, Sept. 30, 1974, 210412
Int. Cl.² F16L *55/10;* **B65D** *59/02, 39/04*
U.S. Cl. 138—89 **1 Claim**



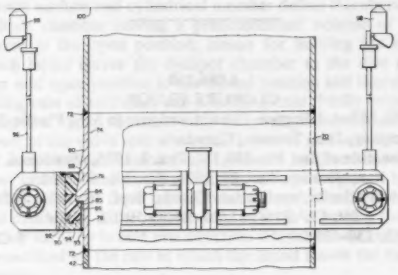
1. A resiliently deformable plug for closing an end of a tube, the plug comprising: a deformable circular disc portion; a deformable annular skirt portion of circular cross-section which projects from the periphery of the disc portion to one side thereof and substantially normal to the normal plane of the disc portion, the skirt portion presenting an outwardly directed annular closure member having an outer diameter which is reducible by resilient deflection of the disc portion to either side thereof; and a pin member which is integral with said disc portion and projects in the direction of the longitudinal axis of the plug from the center of the disc portion to said one side thereof, the pin member being circular in transverse cross-section throughout its entire length, the outer wall of said pin member being spaced from the inner surface of said annular skirt portion and concentric therewith with the portion of the circular disc portion disposed between the inner surface of the annular skirt portion and the outer surface of the circular base of the pin member comprising a flexible annulus of uniform width, the skirt portion having a terminal edge and said annular closure member comprising an outwardly projecting, annular sealing member of bulbous form as viewed in transverse cross-section disposed intermediate said circular disc portion and said terminal edge, an outwardly directed annular rim member projecting from the periphery of said annular skirt portion between said annular closure member and said terminal edge, said rim member having an annular abutment face extending normal to the axis of the plug and directed toward said disc portion, said annular skirt portion being formed with an annular groove between said annular abutment face and said annular closure member, at least one wall of said groove extending normal to the axis of said plug and being coextensive with said abutment face of the annular rim member, and axial movement of said pin member from its normal position resiliently deflecting said disc portion substantially symetrically about the center thereof and substantially uniformly reducing the outer diameter of said annular skirt portion and the outwardly directed annular closure member.

4,046,169

PIPE SUPPORT FOR USE IN A NUCLEAR SYSTEM

Louis P. Pollono, and Raymond M. Mello, both of Greensburg, Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 9, 1975, Ser. No. 594,477
Int. Cl.[2] F16L *3/00*; F21L *17/02*
U.S. Cl. 138—106 6 Claims



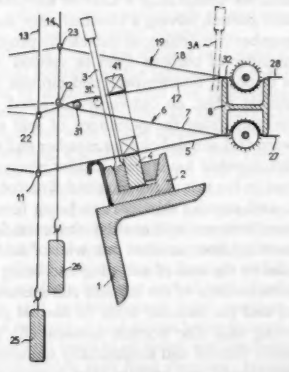
1. A pipe support system comprising:
a vertical pipe;
an integrally formed tubular pipe support structure having the same inside diameter as said pipe, said pipe support structure having the same wall thickness as said pipe, said pipe support structure having a generally triangularly shaped extension formed integral with and extending circumferentially around its outward side, the bottom side of said extension generally forming a ledge, said pipe support structure replacing a portion of said pipe;
an annular load-bearing insulation formed adjacent to said extension, said load-bearing insulation supporting said pipe support structure substantially through said ledge;
means for clamping said load-bearing insulation to said extension, said means for clamping said insulation being located such that a first space is maintained between said means for clamping and said pipe support structure; and
means for providing constant vertical support to said means for clamping.

4,046,170

LOOMS

Yves Juillard, and Victor Riner, both of Mulhouse, France, assignors to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse Cedex, France

Filed June 7, 1976, Ser. No. 693,185
Claims priority, application France, June 11, 1975, 75.18199
Int. Cl.[2] D03D *39/16*
U.S. Cl. 139—20 7 Claims



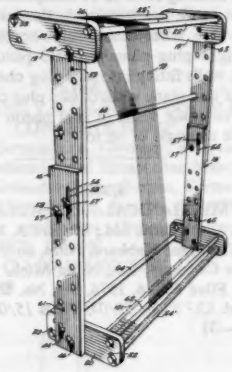
1. A loom comprising a shedding harness with heald frames for forming two superposed sheds in incoming warp, weft inserters for traversing weft through said sheds, a reed for beating up the weft whereby to form upper and lower fabrics, a breast beam having upper and lower edges over which said upper and lower fabrics are taken off, respectively, and a rectilinear elongate transverse member stationarily supported, through its two ends, across the space included, on the one hand between the two sheds and, on the other hand, between the heald frame nearest said reed and the location of the reed in the back position.

4,046,171

HAND LOOM

Kathleen V. Wilson, 3039 Calusa St., Coconut Grove, Fla. 33133

Filed June 30, 1976, Ser. No. 701,346
Int. Cl.[2] D03D *29/00*
U.S. Cl. 139—29 8 Claims



1. A hand-loom comprising (A) spaced posts defining a main normal weaving plane, each side post having an upper end and a lower end and said lower ends each including a portion extending outwardly in perpendicular relation to said plane a common distance and direction, (B) spaced stationary beams spanning the upper and lower ends of the posts and defining a loom frame, (C) means removably connecting the beams and posts together, (D) each of said posts having a surface with a pattern of recesses of common cross sectional area, said surfaces and the recesses of said patterns being in confronting relation with one another, and each of said posts includes a first and a second segment, each of said segment having an inner end and means connecting the inner ends in overlapped relation and said means removably connecting including means for adjusting the overall length of each of said posts by bypassing movement of the inner ends of each over one another, and (E) a pair of spaced movable dowels spanning the posts, each of said dowels having opposite end zones and said end zones being sized for receipt in said recesses.

4,046,172

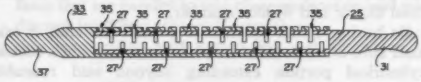
WEAVING DEVICE

Carolyn G. Russell, 6015 Summer Trace Apt. 105, Memphis, Tenn. 38128

Filed Jan. 3, 1977, Ser. No. 756,486
Int. Cl.[2] D03D *29/00*
U.S. Cl. 139—33 8 Claims

1. Spreader means for use with a weaving device of the type including a frame and means for mounting lengths of warp thread to said frame to allow lengths of weft thread to be woven through the lengths of warp thread, said spreader means comprising: an elongated bar member for being rotatably attached to said frame and for passage underneath said

lengths of warp thread, said bar member including a plurality of substantially transverse slots for receiving said lengths of warp thread, certain ones of said plurality of slots being substantially 180° opposed from other ones of said plurality of slots so that certain ones of said lengths of warp thread will be received in certain ones of said plurality of slots while other ones of said lengths of warp thread are held substantially on the outer circumference of said bar member to create a shed between certain ones of said lengths of warp thread and so that when said bar member is rotated substantially 180° upon said frame, certain ones of said lengths of warp thread that were held substantially on the outer circumference of said bar member will be received in certain ones of said plurality of slots while certain ones of said lengths of warp thread that were received in certain ones of said plurality of slots will be held substantially on the outer circumference of said bar member; and an elongated hollow sleeve member for being attached to said frame and for substantially enveloping said bar member, said sleeve member including a plurality of substantially transverse slots, each of said plurality of slots being spaced apart from each adjacent one of said plurality of slots a distance substantially equal to the distance between each adjacent ones of said lengths of warp thread for selectively guiding said lengths of warp thread into said plurality of slots in said bar member.

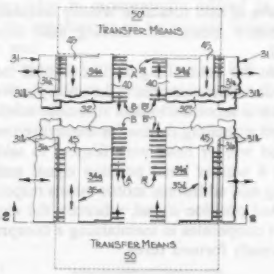


4,046,173

TRIAXIAL WEAVING MACHINE WITH HEDDLE SHEDDING MEANS

Karol Kulczycki, Parsippany, N.J., assignor to Barber-Colman Company, Rockford, Ill.

Filed May 17, 1976, Ser. No. 687,012
Int. Cl.² D03C *13/00*
U.S. Cl. 139—48 **12 Claims**



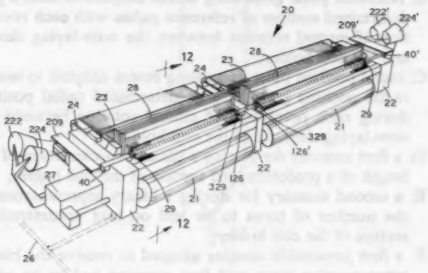
1. A weaving machine for making triaxial fabrics comprising a plurality of elongate heddles arranged in weftwise rows for guiding warp strands, each of said heddles having cutout means therein adapted to be engaged for imparting longitudinal movement thereto; means for shifting said heddles weftwise; stationary means extending weftwise of the weaving machine for guidingly supporting said heddles in said weftwise rows; and means movable to and from extended and retracted positions relative to said stationary means and engaging said cutout means of said heddles for moving said heddles longitudinally of themselves across said stationary means to and from extended and retracted positions for forming warp strands guided thereby into warp sheds.

4,046,174

PNEUMATIC LOOM

Karl W. Weuger, Ward St., North Brookfield, Mass. 01535

Filed Feb. 25, 1976, Ser. No. 661,159
Int. Cl.² D03D *47/24*
U.S. Cl. 139—437 **10 Claims**



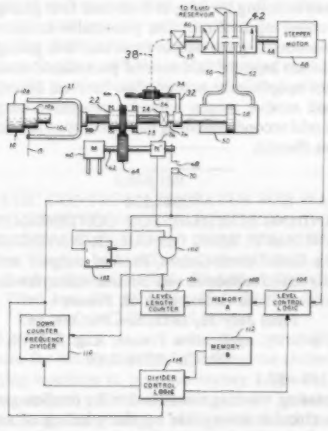
1. A loom, comprising means for forming a warp shed, inserting means mounted at one end of said warp shed for inserting a filling pick into said warp shed, said inserting means including conduit means for holding and conveying a projectile, said conduit means being transferable from a first position to a second position, said conduit means being connected at one of said positions to a source of fluid under pressure, for propelling said projectile through the warp shed, and said conduit means being connected in at least one of said positions to means for disposing filling within said projectile, and further comprising a tubular fluid supply means connected tangentially to said conduit means at a point adjacent the connection to the filling disposing means, whereby fluid under pressure entering said conduit means via said fluid supply means creates a vortex through which said filling must pass prior to disposition in said projectile.

4,046,175

PRECISION LEVEL COIL WINDING APPARATUS

Alexander C. Gardner, and Ronald L. Gable, both of Dayton, Ohio, assignors to Machine Products Corporation, Dayton, Ohio

Filed Mar. 15, 1976, Ser. No. 666,871
Int. Cl.² B21F *3/04*
U.S. Cl. 140—92.1 **16 Claims**



1. In a coil winding system adapted to provide incremental

axial movement during mutual rotation and relative axial movement of a wire-laying device and a coil holder member, apparatus for effecting and controlling the incremental axial movement comprising:

A. motive means responsive to an increment input pulse for effecting a predetermined relative axial movement between the wire-laying device and the coil holder;

B. reference pulse generating means adapted to issue a predetermined number of reference pulses with each revolution of mutual rotation between the wire-laying device and the coil holder;

C. radial position pulse generating means adapted to issue a radial position pulse at a predetermined radial position during each revolution of mutual rotation between the wire-laying device and the coil holder;

D. a first memory for storing a binary representation of the length of a predetermined section of the coil holder;

E. a second memory for storing a binary representation of the number of turns to be laid on said predetermined section of the coil holder;

F. a first presettable counter adapted to receive the binary representation from said first memory and to be selectively preset thereby, said first counter further including a count input;

G. first decoding means connected to sense the count in said first presettable counter and responsive to a predetermined count therein for issuing an output pulse;

H. bistable means having first and second stable states, said bistable means being connected to said first decoding means and responsive to an output pulse therefrom for assuming said second state;

I. first gating means having an output, a first input connected to receive said reference pulses and a second input coupled to said bistable means whereby said reference pulses appear at the output of said gating means only when said bistable means is in said first state;

J. a second presettable counter adapted to receive the binary representation from said second memory and to be selectively preset thereby, said second counter including a count input;

K. second decoding means connected to sense the count in said second presettable counter and responsive to a predetermined count therein for issuing an output pulse;

L. second gating means having an output, a first input connected to receive the binary representation from said second memory, and a second input coupled to receive the output pulse from said second decoding means whereby said binary representation from said second memory is preset into said second presettable counter after said second decoding means issues an output pulse;

M. means coupling the output from said first gating means to said count input of said first presettable counter;

N. means coupling the output from said first gating means to said count input of said second presettable counter; and

O. means coupling the output of said second decoding means to said motive means whereby repetitive output pulses from said second decoding means serve as increment input pulses thereto.

4,046,176

WINDING MACHINE FOR CONTINUOUSLY MANUFACTURING CIRCULAR WAVEGUIDES

Jean C. Le Gall, Perros-Guirec, France, assignor to Etat Francais, Issy-les-Moulineaux and Societe Anonyme de Telecommunications, Paris Cedex, both of, France

Filed July 31, 1975, Ser. No. 600,567
Claims priority, application France, Aug. 2, 1974, 74.26959
Int. Cl.[2] B21F *3/04*
U.S. Cl. 140—92.1 **2 Claims**

1. A rotating winding machine for the continuous manufacture of a circular waveguide by the winding of an insulated metal conductor in the form of a wire around a spindle comprising:

an elongated frame for supporting a rotatable winder member;

a winder member for winding of said insulated conductor which is rotatably mounted within said frame having a longitudinal axis of rotation;

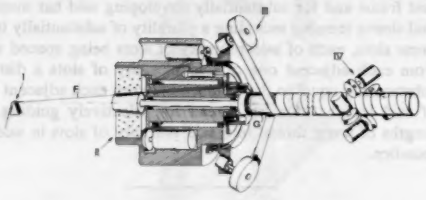
said rotatable winder member having an axial bore for passage of a spindle and a channel inclined with respect to the axis of rotation of said winder for the passage of a continuous length of said wire through said channel from a supply reel;

a wire tensioning device supplying said wire to said channel under a predetermined tension;

a wire guide means for said wire tensioning device to guide the wire at the intersection of the channel and the longitudinal axis of said winder member;

spindle having a first cylindrical portion centered in said axial bore of said rotatable winder member and a second cylindrical portion extending beyond said rotatable winder member in the direction opposite to said wire tensioning device and about which said wire is wound inside by side abutting relation;

spindle-support means for fixing said first cylindrical portion of said spindle with respect to said frame while allowing passage for said wire;



motor means to drive said winder member for winding around said second cylindrical portion of said spindle the length of wire continuously emerging from said inclined channel, the already formed turns of wire about, said second cylindrical portion being thus pushed in said direction by said length of wire;

capstan driver means bearing against said second portion of said spindle for supporting said second portion and applying to said already formed turns a compression stress in the direction of said rotatable winder member;

additional motor means for driving said capstan driver means and

control means for controlling said additional motor means, said control means comprising an axially movable winder head which is mounted in said rotatable winder member, sensing and signalling means for detecting the axial position of said winder head with respect to said frame and providing a winder head position signal and means for controlling said additional motor means responsive to said winder head position signal, whereby the capstan driver movement cooperates in maintaining a compression stress on said already formed turns.

4,046,177

MACHINE FOR STRAIGHTENING WIRES

Hans Louis, Weyerstrasse 213, D-565 Solingen-Wald, and Eberhard Leverkus, Katternberger Strasse, D-565 Solingen-1, both of Germany

Filed May 28, 1976, Ser. No. 690,947
Claims priority, application Germany, May 30, 1975, 2523831
Int. Cl.[2] B21F *1/02, 1/04*
U.S. Cl. 140—147 **1 Claim**

1. A machine for straightening wire, comprising:

a frame;

a hollow shaft rotatably supported on said frame;

a motor connected to said shaft to drive the same;

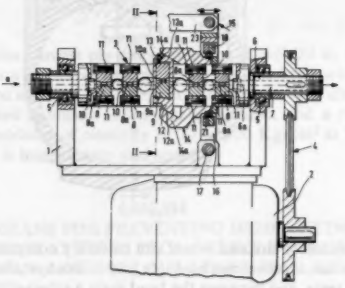
at least three axially spaced dies mounted on said shaft and

rotatable therewith, each of said dies having a central aperture through which the wire passes, and the end dies having their apertures located on the axis of rotation of the shaft;

the middle die being slidable radially with respect to the hollow shaft between a first position wherein its aperture is coincident with the axis of rotation of the shaft, and a second position displaced radially from said axis; said middle die having opposite plane surfaces that are parallel to one another and inclined with respect to the axis of rotation of the shaft;

a slotted link surrounding said middle die and slidable axially with respect to said shaft, said slotted link having opposed faces that are parallel to said plane surfaces on said middle die and in sliding contact therewith;

a ring surrounding said slotted link and having an inner



bearing connected with the link so as to rotate therewith, said ring being stationary while the shaft rotates;

an actuating fork having a pair of laterally spaced legs that straddle said ring and are swingably connected to said frame, said legs being connected to said ring whereby swinging movement of the fork about its pivot axis causes said slotted link to slide axially along said shaft, thereby shifting said middle die radially from one of said positions to the other, enabling said middle die to be shifted instantaneously from said second position to said first position when the wire is momentarily halted in its progress through the machine so as to prevent fatigue-stressing of the wire; and

link means connected to said actuating fork to actuate the latter in the direction to shift said middle die to said first position when the wire halts, and to said second position when the wire resumes its travel through the machine.

4,046,178

FLOATING BAG FOR POLLUTION STUDY

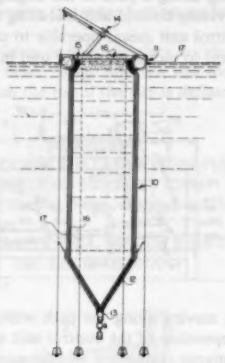
John N. Case, Victoria, Canada, assignor to Case Existological Laboratories, Ltd., Victoria, Canada

Continuation of Ser. No. 579,075, May 19, 1975, abandoned. This application Oct. 6, 1976, Ser. No. 729,973

Int. Cl.² B65B *3/04*

U.S. Cl. 141—1 **3 Claims**

3. A method of deploying a fluid filled bag in a marine or like environment, comprising providing a bag of a flexible material hving a resistance to stretching, supporting the bag from the surface of the water by flotation means, and raising the level of the fluid within the bag to a level slightly above the level of the fluid in the bag at which the fluid within the bag and the water around the bag are in equilibrum for maintaining turgidity in the total structure so as to resist disturbance of the bag due to



variations in the conditions in the environment in which the bag is deployed.

4,046,179

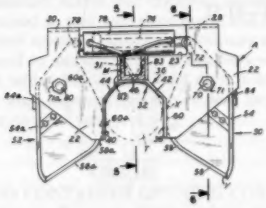
CROSS-CUT SHEAR FOR TREES

Patrick J. Crawford, 1013 S. Lincoln St., Shawano, Wis. 54166

Filed July 10, 1975, Ser. No. 594,694

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 E **10 Claims**



1. A cross-cut shear for trees comprising:

a. first and second cooperating blades, each blade having

b. a straight cutting edge portion terminating in

c. a convex arcuate cutting edge portion,

d. a first pivot pin and a second pivot pin spaced from the first pivot pin with the first and second pivot pins mounting each of said convex first and second blades, respectively, with said arcuate edge cutting portions directly opposed for first cutting when said blades are pivoted towards each other with the straight cutting edge portions subsequently cutting and abutting in closed relationship, and

e. means for pivoting each of said blades.

4,046,180

AUTOMATIC CONTROL APPARATUS FOR WANEY EDGE FORMING MACHINES

Henry James Marshall, Vancouver; Stuart Walter Windblad, and William Wagner, both of Surrey, all of Canada, assignors to Island Lumber Specialties Ltd., Richmond, Canada

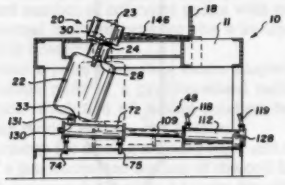
Filed June 15, 1976, Ser. No. 696,185

Int. Cl.² B27C *5/00*

U.S. Cl. 144—117 B **18 Claims**

1. Apparatus for automatically controlling the cutter unit of a wood edging machine to produce waney edges on boards moving along a feed path and leaving knots at said edges substantially uncut, comprising a main control unit including means connected to a cutter unit of a wood edging machine and normally operable to cause swinging movement of said

cutter unit in accordance with a predetermined pattern, said movement enabling the cutter unit to cut into the edges of boards moving along a path in the edging machine past said unit, an overriding control unit including means connected to the main control unit means operable to cause said main control unit means to move the cutter unit in the direction away



from boards moving along the path without interfering with the normal operation of the control unit means, and scanning means operatively connected to said overriding control unit means for detecting knots in the edges of boards moving along said path to cause the overriding control unit means to operate and move the cutter unit respectively to avoid said knots.

4,046,181

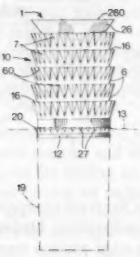
INSERT

Arthur Derrick Barnsdale, Alne Cote, Great Alne, Warwickshire, England

Filed July 8, 1976, Ser. No. 703,425

Int. Cl.² F16B *15/06*

U.S. Cl. 151—41.73 **2 Claims**



1. An insert comprising an exterior part thereof having a series of annular peripheral taper portions, each having the same diameter and each of which tapers down from a rear shoulder thereof in a direction towards the leading end of the insert so that said taper portions are in barb-like formation, each said taper portion being longitudinally serrated with serrations of V-form at its rear part to provide a plurality of projections for retention of the insert in a hole therefor in a parent material, the serrations running out with forward reduction of each taper portion; a reduced diameter cylindrical pilot portion at the leading end of the insert; an external annular lip about the pilot portion closely adjacent the leading end of said pilot portion and axially spaced along the pilot portion from the adjacent taper portion, which lip is of taper form tapering down towards the leading end of said pilot portion and is of substantially smaller diameter than that of the said series of serrated annular peripheral taper portions for wall engagement in a said hole in order to assist in maintaining initial axial alignment and contact of the insert with the hole at the commencement of and during installation of the insert therein; and a rear plain external annular peripheral taper portion behind the rearmost serrated taper portion and of substantially the same diameter thereof and also tapering down in a direction towards the leading end of the insert in order to close a said hole and retain parent material therein on complete installation of the insert.

4,046,182

SAFETY TIRE AND WHEEL ASSEMBLIES

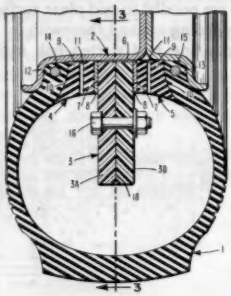
Frank Farnsworth, Sutton Coldfield, England, assignor to Dunlop Limited, London, England

Filed July 29, 1975, Ser. No. 600,129

Claims priority, application United Kingdom, Aug. 8, 1974, 34957/74

Int. Cl.² B60C *17/04*

U.S. Cl. 152—158 **14 Claims**



1. A safety tire and wheel rim assembly comprising a pneumatic tire, a wheel rim having a pair of bead retaining flanged, bead seats, and between the bead seats a substantially uniform diameter, a safety insert for carrying load between the wheel rim and the tire when the tire becomes deflated, the insert being mounted for circumferential slippage relative to the wheel rim when the assembly is used with the tire in a deflated condition and having a pair of spacers extending circumferentially around the rim on either side of said insert, with one surface of each spacer engaging the axially inner surface of the respective beads of the tire and the other surface of each spacer engaging the sides of said safety insert to provide axial location of said insert, the surface of each spacer engaging a bead having a high coefficient of friction with rubber and the surface of the spacer engaging the insert having a low coefficient of friction with the material of the insert with which it is in contact, to permit circumferential slippage of the insert on the rim relative to the tire beads.

4,046,183

RADIAL TIRE HAVING A HIGHLY DURABLE BEAD STRUCTURE

Hidenori Takahashi, Tokorozawa; Hiroshi Tamura, Kunitachi; Shigeo Watanabe, Kokubunji, and Toshiyuki Sogi, Higashi-Yamato, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Mar. 5, 1976, Ser. No. 664,229

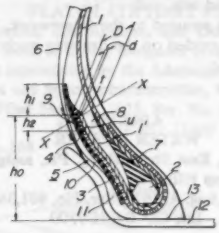
Claims priority, application Japan, Mar. 19, 1975, 50-32159

Int. Cl.² B60C *9/04, 15/00*

U.S. Cl. 152—362 R **10 Claims**

1. A radial tire having a highly durable bead structure, comprising a carcass ply composed of a rubberized layer containing a plurality of cords parallel to one another and disposed in radial relationship with respect to the equatorial line of the tire and at least two inner reinforcing cord layers covering that portion of the carcass ply which is wound about a bead core from the inside toward the outside thereof and extended upwardly to form a turn up portion and each composed of a plurality of cords inclined with respect to tangential lines touching at a circle formed by the bead core, in the tire the upper end of at least one of the inner reinforcing cord layers is located at a position which is lower than the upper end of the turn up portion of the carcass ply by (1/10 to $\frac{1}{3}$)h_0 where h_0 is

a vertical height of the upper end of the turn up portion of the carcass ply measured from a base of the bead, a space formed between the turn up portion of the carcass ply and a reinforcing cord layer exclusive of said reinforcing cord layer has an interlayer gauge d measured on a line passing through the upper end of the turn up portion of the carcass ply and perpendicular to the carcass ply and defined by $d = (1/30 \text{ to } 1/5)D$ where D is a thickness of that portion of the bead which is measured on said line, where h_0, d and D are measured after the tire has been mounted and normally inflated, and a rubber having a modulus of elasticity of 20 to 100 Kg/cm² at 100% elongation is inserted into said space.



4,046,184

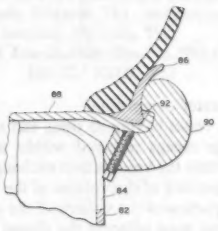
SAFETY MEANS FOR PREVENTING DEMCUNTING OF LOW OR FLAT TIRES FROM VEHICLE WHEELS

John A. Diehl, Apt. No. 305 S, 2111 Jefferson-Davis, Arlington, Va. 22202

Continuation-in-part of Ser. No. 494,163, Aug. 2, 1974, abandoned. This application June 27, 1975, Ser. No. 591,077

Int. Cl.² B60B 25/06

U.S. Cl. 152—407 **1 Claim**



1. In a two-piece rim system for receiving and retaining a tire for a wheel of a motor vehicle, the tire including an outer bead portion, the system comprising:

A. a bowl-shaped disc-type body portion provided, at spaced circumferential locations, with openings adjacent to a rim thereof,

B. a rim base affixed to the rim of the body portion and including a circumferentially-extending upturned outer edge, and

C. a circumferentially-extending outer flange resting on the top surface of the rim base and engaged inside the upturned outer edge, the outer flange having an inner surface engaging the outer bead portion of the tire,

The improvement comprising:

D. a C-shaped clamp comprising a central portion and first and second end portions turned toward an inner side of the central portion, the clamp being positioned in the openings of the body portion, the inner side of the central portion being positioned over said outer edge of the rim base, the first end portion of the clamp forming a protuberance bearing against an outer surface of the tire-engaging outer flange, the second end portion of the clamp having an inner side of conforming shape to fit adjacently to the outer bottom surface of the rim base, and

E. a set screw threaded in the second end portion of the clamp and engaging the outer bottom surface of the rim base,

whereby the clamp is fixed in place to the rim base to prevent the outer flange and the tire from becoming detached from the rim if the tire is deflated.

4,046,185

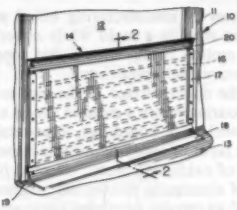
TEMPORARY DOOR INSTALLATION FOR GRAIN CARRYING FREIGHT CAR

William E. Bruning, Omaha, Nebr., assignor to OMNI Corporation, Omaha, Nebr.

Filed Oct. 17, 1974, Ser. No. 515,573

Int. Cl.² E06B 3/00

U.S. Cl. 160—368 G **2 Claims**



1. In combination, a freight vehicle having a floor and a wall having door posts defining a doorway opening, a flexible temporary door installed across said doorway interiorily of said vehicle and secured to said wall door posts, and an upwardly tapered pry-board mounted across said doorway adjacent said floor and secured to said wall door posts, between said wall door posts and said door whereby said door is relatively uncreased in the area adjacent the top of said pry-board and provides a door to door post seal.

4,046,186

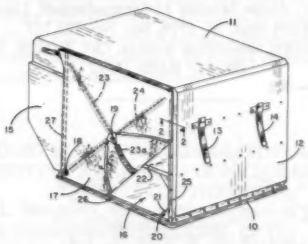
CARGO CONTAINER OPENING COVER

Arnold B. Nordstrom, Torrance, Calif., assignor to Transequip Inc., El Segundo, Calif.

Filed Feb. 12, 1976, Ser. No. 657,607

Int. Cl.² A47H 3/00

U.S. Cl. 160—368 R **10 Claims**



1. A cover for an opening in a cargo container comprising a curtain of flexible material, means for securing said curtain to said container along one side and on the outside of said opening, flanging means rigidly secured to said container for providing a flange around said opening substantially uninterrupted from one end to the other of said curtain securing means, said flange standing out away from said container and extending in a direction away from said opening, thereby providing a channel from substantially one end to the other of said curtain securing means, said curtain being of a size and shape to overhang said flange, and having along its edge a tunnel running

substantially uninterrupted from one end to the other of said curtain securing means, a cable inserted in said curtain tunnel, said cable having one end anchored at said one end of said curtain securing means, tensioning means anchored to said container at the other end of said curtain securing means for pulling said cable taut in said channel, and releasable latching means for latching said tensioning means with tension on said cable.

4,046,187

PROCESS OF MANUFACTURING KILLED STEEL INGOTS OF SUPERIOR QUALITY

Shigeru Matsuyama, Utsunomiya, and Hiroshi Mikami, Imaichi, both of Japan, assignors to Aikoh Co., Ltd., Tokyo, Japan

Filed June 16, 1975, Ser. No. 587,104
Claims priority, application Japan, June 24, 1974, 49-71428
Int. Cl.² B28B *7/36*
U.S. Cl. 164—53 **2 Claims**

1. In the process of manufacturing killed steel ingots by solidifying molten steel in a mold while covering the upper surface of said molten metal with a hot topping material, wherein the improvement comprises:

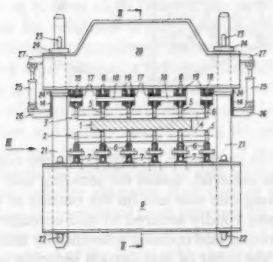
arranging on the upper surface of the molten steel immediately after pouring it into a mold in excess of 2 kg. per ton of molten steel of a board-like, heat-retaining material having (a) a layer of easily-flammable material consisting of a mixure of oxidizable metal, selected from the group consisting of aluminum, silicon and magnesium and mixtures thereof; an oxygen supplying agent selected from the group consisting of iron oxide, manganese oxide, alkali metal nitrate, and mixtures thereof; a burning modifier selected from the group consisting of, sodium fluoride, cryolite and mixtures thereof; and a binder and (b) a molded laminated layer of heat-insulating material consisting of (i) 30 to 77 percent by weight of charcoal particles having a particle size of from 1 to 10 mm, (ii) 20 to 50 percent by weight of a heat expansible refractory material selected from the group consisting of graphite, vermiculite, obsidian, perlite and mixtures thereof, and (iii) a binder, whereby the concentration of non-metallic inclusions in the bottom of the ingot formed are reduced.

4,046,188

ARCUATE SUPPORTING AND GUIDING CONSTRUCTION FOR CONTINUOUSLY CAST STRANDS

Franz Kagerhuber, Traun, and Werner Scheurecker, Linz, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Sept. 23, 1976, Ser. No. 725,717
Claims priority, application Austria, Oct. 1, 1975, 7486/75
Int. Cl.² B22D *11/12*
U.S. Cl. 164—282 **4 Claims**



1. In an arcuate supporting and guiding construction for continuously cast strands, in particular slabs, of the type including a stationary framework, a set of inner arcuate longitudinal carriers and a set of outer arcuate longitudinal carrier positioned within the framework, at least one of said sets of longitudinal carriers being elastically deformable and braceable relative to the framework for adjustment to various strand thicknesses, and a plurality of rollers connected to each of the sets of longitudinal carrier to support the strand on two opposite sides thereof, the improvement comprising

transverse carriers arranged at a distance from one another and connected to all the arcuate longitudinal carriers of at least one of said sets, and

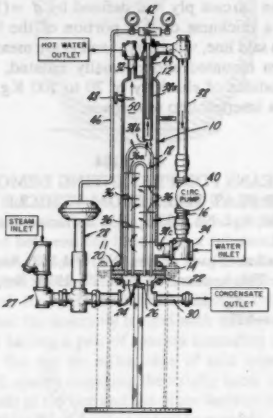
drawing anchors secured to the framework, the transverse carriers being guided on the drawing anchors and fixable relative thereto.

4,046,189

WATER HEATER

John A. Clark, Jr., East Stroudsburg, Pa., assignor to Harsco Corporation, Camp Hill, Pa.

Filed Aug. 4, 1975, Ser. No. 601,348
Int. Cl.² B60H *1/00*
U.S. Cl. 165—39 **8 Claims**



1. A water heater comprising:

an elongated vessel having an open end and a closed end;

heat exchange means received within said open end and defining within the vessel a heat exchange zone occupying the major portion of the volume of the vessel and leaving the minor portion of the volume of the vessel for a storage and blending zone adjacent the closed end of the vessel, the heat exchange means including a bundle of elongated heat exchange elements spaced over substantially the full cross-sectional extent of the vessel, said cross section being perpendicular to the direction of elongation of the vessel, and extending from said open end towards said closed end over the major portion of the length of the vessel;

a cold water inlet located adjacent said open end of the vessel;

a hot water outlet located adjacent said closed end of the vessel in the storage and blending zone and remote from the heat exchange zone;

means for recirculating water through the heat exchange zone of the vessel including a recirculation conduit, the conduit having an inlet located within the vessel closely adjacent the inner end of the bundle of heat exchange elements for drawing water essentially solely from the heat exchange zone of the vessel and an outlet communicating with the vessel adjacent said open end thereof for conduction of water into and through the heat exchange zone; and

control means for controlling the input of heat to the heat exchange means in response to temperature changes in the

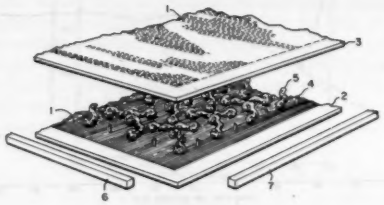
water coming from the heat exchange zone of the vessel, the control means including a temperature sensor received entirely within the recirculation conduit such that it is responsive to a high velocity flow of water drawn essentially solely from the heat exchange zone of the vessel.

4,046,190

FLAT-PLATE HEAT PIPE

Bruce D. Marcus, Los Angeles, and George L. Fleischman, Inglewood, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 22, 1975, Ser. No. 579,989
Int. Cl.² F28D *15/00*
U.S. Cl. 165—105 **6 Claims**



1. A heat pipe device comprising:

i. two flat-plates in parallel planes having edges sealed and aligned normal to the parallel plates with capillary grooves in the facing surfaces at right angles to the grooves of the opposing plate; and

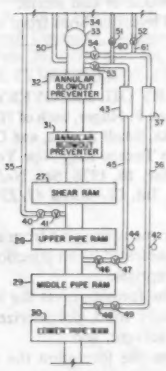
ii. metal wicking intersecting every groove.

4,046,191

SUBSEA HYDRAULIC CHOKE

Robert Arthur Neath, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed July 7, 1975, Ser. No. 593,419
Int. Cl.² E21B *7/12*
U.S. Cl. 166—.5 **12 Claims**



1. An apparatus for drilling a subsea well from a drilling platform at the surface of a body of water, which comprises

a riser conduit extending between the platform and the well;

at least one blowout preventer connected to said riser conduit near the lower end thereof;

at least one fluid bypass conduit providing at least one fluid flowpath from the well at a point below said blowout preventer to the lower interior portion of the riser conduit at a point above the uppermost blowout preventer; and

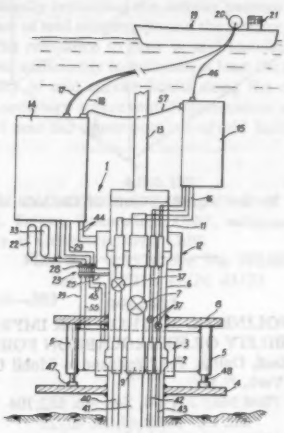
a means in said bypass conduit for regulating fluid flow through said bypass conduit.

4,046,192

METHOD AND APPARATUS FOR INSTALLING A CONTROL VALVE ASSEMBLY ON AN UNDERWATER WELL HEAD

Eric Darnborough, Chearn-Surrey, England, and Rene Henri Coulboy, Sausset-les-Pins, France, assignors to Seal Petroleum Limited, London, England

Filed June 14, 1976, Ser. No. 695,718
Claims priority, application France, June 13, 1975, 75.18569
Int. Cl.² E21B *33/035*
U.S. Cl. 166—.6 **17 Claims**



1. A method of installing an underwater assembly comprising at least one master valve on an underwater oil well head, comprising the steps of: lowering in a non-rigid manner by remote guidance and propulsion means connected to a tool comprising a first connection means for connection of said tool to said assembly, second connections means for connecting said assembly to said well head, means for checking the sealing-tightness of any circuits required; controlling from the surface said first and second connection means, and for controlling any elements required inside said well; raising said tool after checking said circuits; and actuation of means for disconnection of said first connection means, wherein said operations are controlled from the surface by means of flexible connections providing the required power.

4,046,193

CLOSED ELECTRICAL APPARATUS CABINET EMBODYING A VAPORIZATION CHAMBER AND CABINET TOP THEREOF

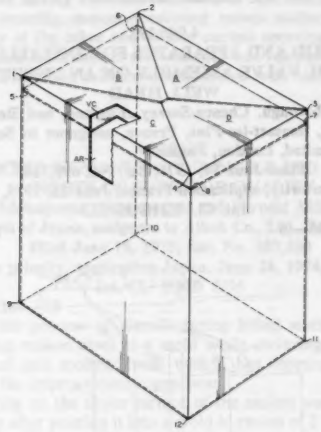
Michael L. Dougherty, Sanford, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 18, 1976, Ser. No. 658,948
Int. Cl.² F28D *15/00*; H01L *23/42*
U.S. Cl. 165—105 **6 Claims**

1. A cabinet for electrical equipment comprising an enclosure having side walls and a bottom surface, a partition defining two compartments one on top of the other, the lower compartment containing electrical equipment and the top compartment being a sealed compartment forming a vaporization chamber defined between said partition as a heat sink and a heat dissipator serving as the top surface of said cabinet;

with said vaporization chamber containing liquid resting by gravity on said partition and having a vaporization temperature above 80° F and below 120° F; and

with said top surface being recessed from a horizontal plane



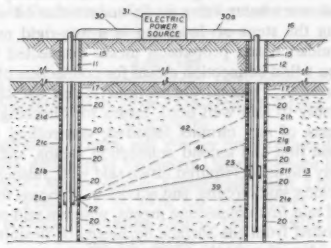
defined by the highest points of the side walls of said cabinet.

4,046,194

ELECTROLINKING METHOD FOR IMPROVING PERMEABILITY OF HYDROCARBON FORMATION

Wayne B. Cloud, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 3, 1976, Ser. No. 682,706
Int. Cl.[2] E21B *43/00, 43/26*
U.S. Cl. 166—248 **12 Claims**



1. A method of improving the permeability of a hydrocarbon bearing formation such as a coal seam or the like, said method comprising:

drilling a first well into said formation;

drilling a second well into said formation spaced from said first well;

completing each of said wells with a string of casing having a portion passing into said formation comprised of alternating sections of conduit made from electrically conductive material and electrically nonconductive material, said strings of casing each having more than one electrically conductive section lying within said formation;

lowering an electrode in said first well and into contact with one of said electrically conductive sections of casing within said formation;

lowering an electrode in said second well and into contact with one of said electrically conductive sections of casing within said second well; and

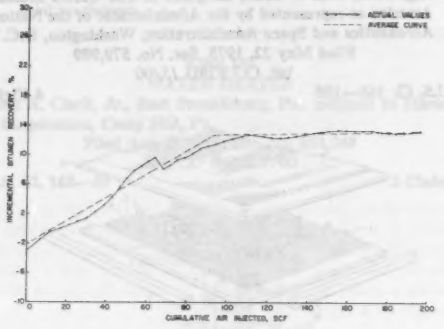
flowing electric current between said electrodes.

4,046,195

THERMAL RECOVERY OF HYDROCARBONS FROM TAR SANDS

Phillip J. Cram, Calgary, and David A. Redford, Fort Saskatchewan, both of Canada, assignors to Texaco Exploration Canada Ltd., Calgary, Canada

Filed June 18, 1975, Ser. No. 588,125
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—272 **7 Claims**



1. A method for the recovery of hydrocarbons from a subterranean hydrocarbon-bearing formation traversed by at least one injection well and at least one production well and having fluid communication therebetween comprising the steps of;

a. injecting via said injection well steam until steam is produced at said production well,

b. thereafter injecting via said injection well a mixture of steam and an oxygen-containing gas said mixture being injected at a temperature corresponding to the saturation temperature for saturated steam at the pressure of said formation whereby a low temperature oxidation is established in said formation until an optimum amount of said gas in the range of about 140 to 200 pore volumes at standard conditions has been injected simultaneously with said steam,

c. terminating injection of said oxygen-containing gas and continuing injection of said steam,

d. producing said hydrocarbons from said production well.

4,046,196

SECONDARY OIL RECOVERY PROCESS

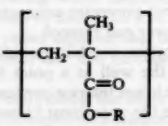
Alfred Brown; Stephen F. Hager, both of Houston, Tex.; Moutaz Chichakli, Dhahran, Saudi Arabia, and Ching H. Wu, Golden, Colo., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 18, 1976, Ser. No. 668,016
Int. Cl.[2] E21B *43/22*
U.S. Cl. 166—273 **19 Claims**

1. The process for recovering oil from an oil-bearing subterranean formation penetrated by an injection well and a production well which comprises:

a. injection into the formation via the injection well a solution of a normally solid, polymerized methacrylate in a water miscible solvent, and

b. recovering from the formation the oil displaced by the injected solution via the said production well, and wherein the said polymerized methacrylate is a homopolymer having recurring units of the formula:



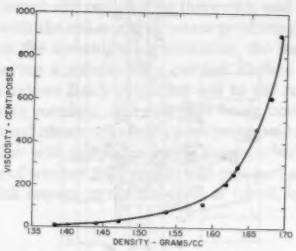
wherein R is alkyl of from 1 to about 5 carbon atoms.

4,046,197

WELL COMPLETION AND WORKOVER METHOD

Clay Gruesbeck, Jr.; Walter L. Penberthy, Jr., and Thomas W. Muecke, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed May 3, 1976, Ser. No. 682,008
Int. Cl.[2] E21B *21/00*; C09K *7/00*
U.S. Cl. 166—305 R 11 Claims



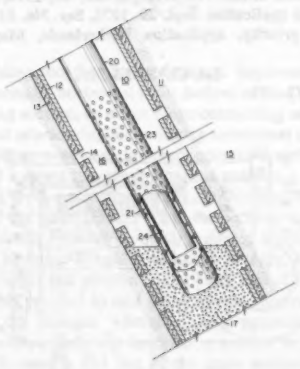
1. In a well completion and workover method wherein a subterranean formation is contacted with a treating fluid, the improvement wherein said treating fluid comprises a saturated aqueous saline solution having a density of at least about 1.2 g/cc at 10° C and having finely divided particles of a water soluble salt suspended therein, said particles of salt being present in sufficient quantities to substantially increase the density of said treating fluid, and minor amounts of xanthomonas gum and a polyphosphate acid ester to prevent settling of said salt particles.

4,046,198

METHOD AND APPARATUS FOR GRAVEL PACKING WELLS

Clay Gruesbeck; William M. Salathiel; Thomas W. Muecke, and Claude E. Cooke, Jr., all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Feb. 26, 1976, Ser. No. 661,662
Int. Cl.[2] E21B *33/00, 43/04*
U.S. Cl. 166—278 7 Claims



1. In a method of gravel packing a perforated liner opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said liner and upwardly through a stinger pipe which extends substantially through the entire length of said liner, the improvement comprising said stinger pipe having an outside diameter large enough to substantially restrict the annular passage defined by said stinger and the interior of said liner so that the resistance to flow in said annular passage is increased sufficiently to maintain at least the minimum flow velocity of said carrier liquid along the outside of said liner necessary to prevent the premature settling of said gravel and formation of gravel dunes near the upper portions of said liner.

4. In a method of gravel packing a perforated liner opposite a subterranean formation in a well wherein a carrier liquid having gravel suspended therein is flowed downwardly along the outside of said liner and upwardly through a stinger pipe which extends substantially through the entire length of said liner, the improvement comprising:

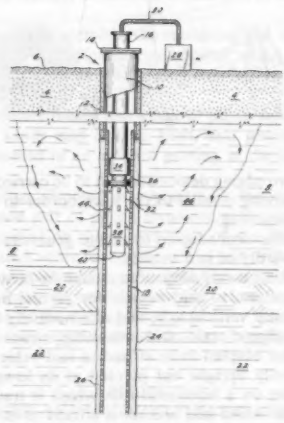
longitudinally restricting the annular passage defined by the exterior of said stinger pipe and the interior of said liner so that the resistance to flow in said annular passage is increased sufficiently to maintain at least the minimum flow velocity of said carrier liquid along the outside of said liner necessary to prevent the premature settling of said gravel near the upper portions of said liner.

4,046,199

STEAM INJECTION APPARATUS AND METHOD

Vincent G. Tafoya, Bakersfield, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed July 6, 1976, Ser. No. 703,053
Int. Cl.[2] E21B *43/24, 43/25*
U.S. Cl. 166—303 15 Claims



1. An apparatus for injecting steam into a subterranean formation via a tubing-containing well penetrating the subterranean formation comprising:

an elongated hollow housing having sidewalls, an open upper end an an open lower end, said open upper end being adapted to be attached to the lower end of the tubing;

coupling means for attaching the upper end of the elongated hollow housing to the bottom end of the tubing;

plug means to close the open lower end of the elongated hollow housing;

a plurality of circumferentially-spaced apertures in the sidewall of the elongated hollow housing;

a jet nozzle extending outwardly and downwardly from each aperture at an angle of from 20° to 40° from the axis of the well;

a steam source means located at the earth surface for generating steam; and

a steam conduit means connecting the said steam source

means and the said upper end of the elongated hollow housing for conducting steam to the said housing;

whereby steam injected down the tubing enters the elongated hollow housing, passes through the jet nozzles and is injected into the subterranean formation.

12. A method of injecting steam into a first selected strata of a subterranean formation penetrated by a conduit-containing well comprising:

positioning the conduit so that the lower end thereof is just above the base of the first selected strata, and

passing steam down the conduit, into an elongated closed-bottom-ended elongated housing attached to the bottom of the conduit, out apertures in the sidewall of said housing, through jet nozzles extending beyond each aperture, said jet nozzles pointing outwardly and downwardly from said housing at an angle of from 20° to 40° with respect to the axis of the well and against and into the first selected strata opposite the jet nozzles.

4,046,200

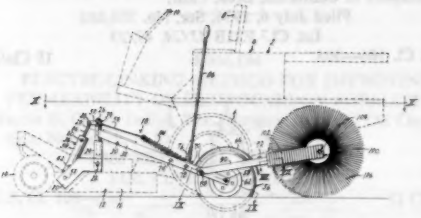
LAWN EDGER ATTACHMENT

David L. Mullet, Heeston; Raymond J. Rilling, Moundridge, and Elmer D. Voth, Newton, all of Kans., assignors to Excel Industries, Inc., Hesston, Kans.

Filed Oct. 28, 1975, Ser. No. 626,032

Int. Cl.² A01B 45/00; A01G 3/06

U.S. Cl. 172—14 9 Claims



1. A lawn edging device adapted to be carried by a powered vehicle moving parallel to the lawn border to be edged, said device comprising:

a. a coulter arm adapted to extend generally forwardly and rearwardly of said vehicle,

b. attaching means adapted to mount the forward end of said coulter arm to said vehicle for pivotal movement on a generally vertical axis, said arm normally trailing behind said pivotal axis, said attaching means comprising a bracket adapted to be affixed to said vehicle, a stub shaft generally upright but pivoted at its lower end to said bracket on a horizontal axis which is transverse to said vehicle when said bracket is affixed to said vehicle, said coulter arm being pivoted on said stub shaft, and

c. power means operable to pivot said stub shaft relatively to said bracket, whereby said coulter arm may be pivoted vertically upwardly or downwardly.

4,046,201

SOIL CULTIVATING IMPLEMENTS OR ROTARY HARROWS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

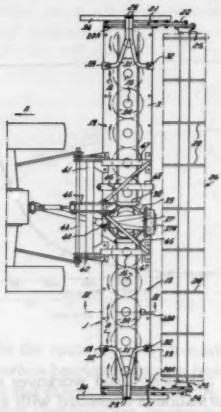
Filed Dec. 3, 1973, Ser. No. 421,111

Claims priority, application Netherlands, Dec. 4, 1972, 7216407

Int. Cl.² A01B 33/06, 23/02

U.S. Cl. 172—59 10 Claims

1. A cultivating implement comprising a plurality of soil-working members positioned in a row that extends transverse to the direction of travel, each of said soil-working members having a substantially horizontal support mounted for rotation on an upwardly extending shaft and driving means connected to rotate said soil-working members each support having at least one holder comprising a downwardly extending portion that is spaced from said shaft and fitted with soil-working means that is rotatable about said shaft, said soil-working means including a lower soil-working portion and an upper fastening portion having a cavity, the lower part of said holder being received in said cavity and fastening means connected to said holder for releasably retaining the holder in said cavity and preventing relative turning, the lower part of said holder which is received in said cavity having a cross-section which is



smaller than the cross-section of the remainder of said holder and extending substantially parallel to the axis of rotation of the soil-working member, said holder including an abutment surface above its lower end that engages a cooperating abutment surface of the fastening portion of soil-working means, said fastening means being received in cooperating bores in said upper fastening portion and the lower part of said holder, said upper fastening portion comprising an inverted frusto-conical portion that merges into the lower soil-working portion.

4,046,202

CULTIVATORS

Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands

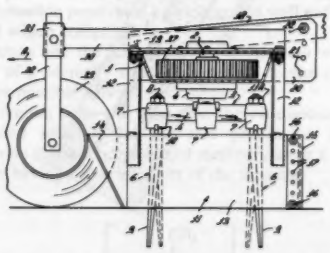
Continuation of Ser. No. 473,572, May 28, 1974, abandoned.

This application Sept. 29, 1975, Ser. No. 617,419

Claims priority, application Netherlands, May 28, 1973, 7307376

Int. Cl.² A01B 33/12

U.S. Cl. 172—72 17 Claims



1. A cultivator comprising a frame and a plurality of power driven soil-working members rotatably mounted on corresponding upwardly extending axes supported on said frame,

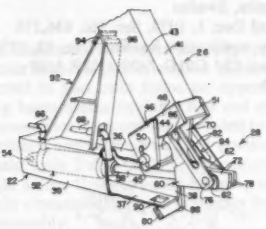
said axes being positioned in a row that extends transverse to the direction of travel and at least one of said soil-working members including downwardly extending soil-working means, a screen supported on said frame and said screen having side and rear parts that extend upwardly around the sides and the rear of said one soil-working member, said side parts being substantially vertical and extending generally parallel to the normal direction of travel, the leading ends of said side parts having outwardly and forwardly divergent portions, the leading edge of each divergent portion being inclined downwardly and rearwardly from its uppermost extremity to the lowermost extremity thereof. said screen being located adjacent said soil-working means and cooperating therewith; said screen in combination with the soil-working means producing finely divided soil within the screen during operation, the rear part of said screen having a substantially vertical surface positioned to gradually release finely crumbled soil to the rear of said one soil-working member, said rear part being connected to said side parts and means selectively positioning said screen into the soil together with said soil-working means, whereby the rate of discharge of worked soil beneath said rear part and behind said screen with respect to the direction of travel, is controlled.

4,046,203

FOLDING TOOL BAR FOR AGRICULTURAL IMPLEMENTS

Gerald G. Ward, Naperville, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Jan. 19, 1976, Ser. No. 649,931
Int. Cl.² A01B *15/14*
U.S. Cl. 172—456 **29 Claims**



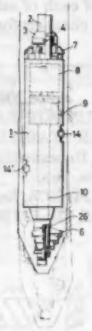
12. A folding tool bar for agricultural implements and including a normally horizontal inner hollow tubular section and an outer wing section, an offset hinge connecting said sections in end-to-end relationship for swinging movement of the wing section between a normal lowered operative earth-working position and a raised inoperative parked position, a crank arm on said wing section which normally extends into the adjacent open end of the inner section when the sections are in alignment, a hydraulic cylinder pivotally mounted within the inner section and having a normally retracted plunger, a draw link having a forward end pivoted to the outer end of the plunger and a rear end pivoted to said crank arm in reentrant fashion relative to the plunger whereby, upon projection of the plunger, the draw link will function in tension to swing the crank arm forwardly and out of the inner section for wing section raising purposes, the effective length of said plunger, less the effective length of the draw link, is such that when the plunger is fully projected, the wing section is moved beyond its 90° position relative to the inner tubular section and thus overlaps the latter.

4,046,204

CONTROLLED DIRECTIONAL DRILLING TOOL

Sabro Takaoka; Akira Shinoda, and Hideo Kobayashi, all of Tokyo, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Nov. 23, 1976, Ser. No. 744,393
Claims priority, application Japan, Nov. 25, 1975, 50-140915
Int. Cl.² E21B *7/08, 3/08*
U.S. Cl. 175—76 **4 Claims**



1. A controlled directional drilling tool comprising in combination:

a drilling rod,

a joint freely flexibly connected to one end of said drilling rod,

a drilling head connected to the remaining end of said joint and provided at the leading end thereof with a drilling bit and in the interior thereof with a driving means for said drilling bit,

a pair of cylinder means and a pair of piston members both disposed inside said drilling head, said piston members each possessed of an inclined portion at the leading end thereof,

a pair of rollers disposed in contact with the inclined portions of said pair of piston members, said pair of rollers being disposed on the lateral sides of the drilling head opposite each other across the axis of said drilling head at positions separated by a prescribed distance and said rollers being freely protrusibly drawn in below the surrounding surface of the drilling head, and

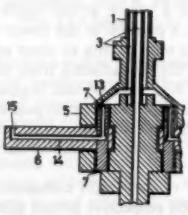
means for delivering compressed fluid to the cylinder means.

4,046,205

EARTH AUGER AND METHOD FOR DRIVING PILES AND THE LIKE BY MEANS OF SAID EARTH AUGER

Kingo Asayama, Hirakata, Japan, assignor to Kabushiki Kaisha Takechi Koumusho, Osaka, Japan

Division of Ser. No. 465,091, April 29, 1974, Pat. No. 3,938,344.
This application Nov. 6, 1975, Ser. No. 629,329
Int. Cl.² E21B *9/26;* E21C *13/04;* E02D *5/46*
U.S. Cl. 175—292 **3 Claims**



1. An auger for driving piles, said auger having a shaft and a boring head, said auger characterized in that said head has

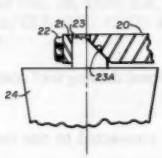
ground formation cutting blades and means pivotally mounting said blades to pivot between retracted and extended positions; stop elements on said head engaging said blades and limiting further pivotal movement when said blades are pivoted to their fully extended position; said head, including said blades when contracted, having a diameter less than that of the pile to be driven; said shaft being hollow and having a passage therethrough; said head having a first conduit opening therein communicating with said passage; a channel in each of said blades communicating with said conduit; the end of said channels extending parallel to said shaft; an upwardly opening discharge port adjacent the end of each of said blades and connected to said end of each of said channels for discharging materials in a flowable state.

4,046,206

LOCKING APPARATUS FOR EARTH BORING CUTTER OR STABILIZER

Howard Earl Mitchell, Duncanville, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 14, 1976, Ser. No. 676,956
Int. Cl.² E21B 9/24
U.S. Cl. 175—364 **5 Claims**



3. A locking apparatus for a rotary head of an earth boring machine, said rotary head having a longitudinal axis of rotation and including a saddle with at least one support arm, a support shaft positioned on said support arm and a rolling cutter mounte on said support shaft, with said rolling cutter adapted to receive an expected radial load and an expected tangential load as said rotary head is rotated, comprising:

a support surface on said support arm for supporting said support shaft, said support surface being positioned so that it forms an acute angle to a plane passing through said longitudinal axis of rotation measured in the directon of rotation of said rotary head, said support surface being substantially perpendicular to the resultant of said expected radial load and said expected tangential load; and

cap means removeably affixed to said support surface, thereby locking said shaft on said support arm.

4,046,207

EARTH DRILLING TOOLS

Thomas Lee Taylor, Box 6048, Odessa, Tex. 79760

Filed Sept. 1, 1976, Ser. No. 719,620
Int. Cl.² E21B 9/22
U.S. Cl. 175—391 **9 Claims**

1. An auger comprising an elongated axial hub member which terminates in a chuck at the upper end thereof and which terminates in a pilot bit at the lower end thereof;

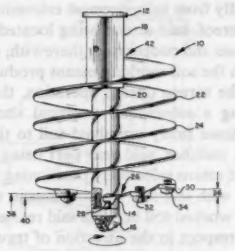
two spaced flights each having an inner edge affixed to said hub, with said flights radiating from said hub to form a spiraling outer rim; each of said flights having an upper end which terminates adjacent to said chuck and a lower end which terminates adjacent to said pilot bit, the lower end of each of said flights being in the form of a leading cutting edge;

the leading edge of one flight commencing at a different vertical elevation respective to said pilot bit as compared to the leading edge of the remaining flight;

the leading cutting edge of each of said flights having a plurality of cutouts formed therein with each cutout being spaced circumferentially, vertically, and radially from one another, means mounting a tooth receiving pocket within each said cutout, thereby enabling a plurality of spaced digging teeth to be received by the leading edge of each flight;

said teeth on one flight being arranged with an innermost tooth located adjacent to said hub, and an outermost tooth located near the outer rim of said flight;

said teeth on the remaining flight being arranged with an



innermost tooth located adjacent to said hub and an outermost tooth located near the outer rim of said remaining flight;

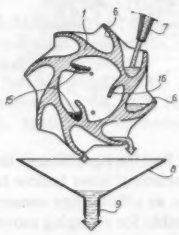
each successive tooth of a flight being progressively spaced circumferentially, radially, and vertically respective to said innermost tooth; the innermost tooth of one flight being disposed 180° from the innermost tooth of the remaining flight, and each of said innermost teeth lying at different radii respective to the axial centerline of said hub.

4,046,208

APPARATUS FOR WEIGHING A FLOWING MATERIAL

Lennart Arvid Stenstrom, Huddinge, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed Dec. 1, 1975, Ser. No. 636,376
Claims priority, application Sweden, Dec. 12, 1974, 7415587
Int. Cl.² G01G 1/00; G01F 3/28
U.S. Cl. 177—19 **2 Claims**



1. Apparatus for determining the quantity of a flowing material, which comprises a drum mounted for rotation about an axis through its center of gravity, said drum being a hollow cylinder having two spaced circular end walls to form a closed chamber, the drum having on the outside wall thereof between said end walls a plurality of troughs located in a circle concentric to said axis, means for charging the troughs at a certain level with flowing material, the quantity of which is to be determined, so that the drum is influenced by a driving moment from substantially the weight of the charged material, the troughs being arranged to discharge, after a certain rotation of the drum, the charged material at a level lower than said charging level, and means for counteracting rotation of the drum by said driving moment thereon, said counteracting means comprising only three interconnected scoops located

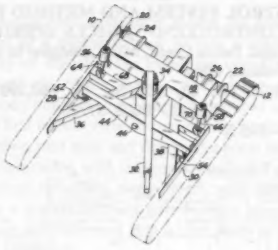
within said closed chamber between said end walls and in a circle concentric to an axis through the common center of gravity of the scoops, the last-mentioned axis forming an angle with a vertical line, the drum being arranged to rotate the scoops around said last-mentioned axis, a predetermined amount of a second material in the closed chamber, the scoops being arranged to successively elevate the second material from a certain level and discharge substantially all of it at a higher level which is at least at the level of said drum axis, the closed chamber being free of any surface which can contact the second material as it falls from a scoop at said higher level to the lowermost part of the chamber during rotation of the drum, whereby the second material falls freely and directly from said higher level to the lowermost part of the chamber and an accurate measurement of the weight of the flowing material is effected regardless of changes in the density of the material.

4,046,209

OSCILLATION LOCKOUT SYSTEM FOR TRACK MOUNTED ROCK DRILL

George N. LaCasse, Holyoke, Mass., assignor to Worthington Compressors, Inc., Holyoke, Mass.

Filed Dec. 11, 1975, Ser. No. 639,755
Int. Cl.[2] B62D *55/08*
U.S. Cl. 180—9.52 1 Claim



1. An oscillation control system for a track type vehicle having a main frame, a pair of endless track assemblies pivotally connected to said main frame on opposite sides thereof, and walking beam means having a first end coupled to one of said track assemblies, a second end coupled to the other of said track assemblies, and an intermediate portion pivotally connected to said main frame, said system comprising:

first single acting fluid actuated cylinder and piston means pivotally connected between said main frame and said one track assembly;

second single acting fluid actuated cylinder and piston means pivotally connected between said main frame and said other track assembly;

fluid conduit means interconnecting the cylinders of said first and second cylinder and piston means for fluid transfer between the cylinders, said first and second cylinder and piston means and said first conduit means forming a closed hydraulic circuit; and

valve means in said fluid conduit to control the transfer of fluid between the cylinders;

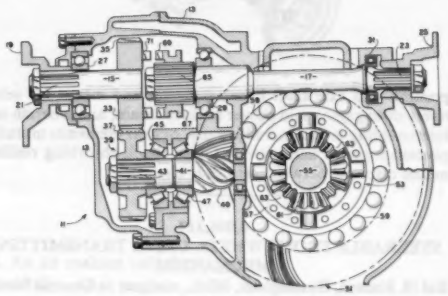
said valve means being variably adjustable between an open position and a closed position, the cylinder and piston of each of said cylinder and piston means being movable relative to each other to transfer fluid between the cylinders when said valve means is in a position other than said closed position to permit relative pivotal movement between said main frame and said track assemblies, and the cylinder and piston of each of said cylinder and piston means forming a rigid connection between said main frame and each of said track assemblies when said valve is in the closed position to prevent relative pivotal movement between said main frame and each of said track assemblies, said valve means in positions between full open and full closed varying the rate of oscillation of said track assemblies.

4,046,210

MULTIPLE DRIVE AXLE ASSEMBLY

Robert K. Nelson, Shaker Heights, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed May 22, 1975, Ser. No. 580,002
Int. Cl.[2] B60K *41/02*
U.S. Cl. 180—24.1 10 Claims



1. A drive axle assembly for selectively transmitting torque from a main drive shaft to one of a first drive axle and a second drive axle and to both the first and second drive axles, comprising:

a. input shaft means in driving engagement with said main drive shaft;

b. output shaft means in driving engagement with said second drive axle, said output shaft coaxial with said drive shaft;

c. gear means associated with one of said input shaft means and said output shaft means, said gear means being in driving engagement with said first drive axle;

d. clutch means in relatively non-rotatable engagement with the other of said input shaft means and said output shaft means and operable to be shifted into engagement with said gear means to divide the torque from said main drive shaft between said first drive axle and said second drive axle;

e. means for shifting said clutch means into engagament with said gear means;

f. means for sensing the rotational speed difference between said first drive axle and said second drive axle; and

g. means for actuating said shifting means in response to said rotational speed difference exceeding a predetermined limit.

4,046,211

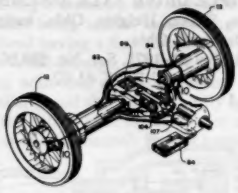
WHEEL-SUPPORT STRUCTURES FOR VEHICLES

Carling D. Allen, 581 N. 640 West, Orem, Utah 84057

Continuation-in-part of Ser. No. 545,192, Jan. 29, 1975, Pat. No. 3,964,563. This application June 8, 1976, Ser. No. 693,845
Int. Cl.[2] B60G *19/02*
U.S. Cl. 180—41 4 Claims

1. In a vehicle having a motor, a transmission coupled to said motor, a differential having oppositely extending axle shafts and coupled to said transmission, axle shaft housing means encasing said axle shafts and nominally horizontal when said vehicle is erect, a pair of opposite wheels, and side-opposite lever structures pivotal with respect to said axle shaft housing means for supporting said wheels and also for operatively coupling said wheels to said axle shaft; an improvement comprising intercoupling means intercoupling said side-opposite lever structures for effecting corresponding counter-movements in said lever structures and said wheels, and power

balance means coupled to said intercoupling means and responsive to any tilt from the horizontal of said axle shaft housing means for actuating said side-opposite lever structures to reorient said wheels such as to reorient to an essentially horizontal



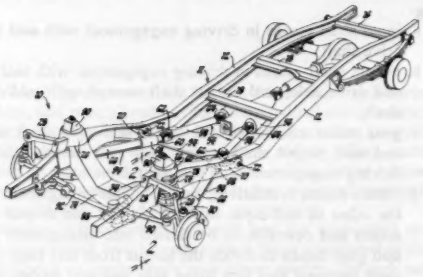
position said axle shaft housing means, and means for selectively disengaging said power balance means, and wherein said intercoupling means includes a pair of gear elememts mutually pivoted together and provided with shock absorbing resilient means disposed between said gear elements.

4,046,212

STEERABLE FRONT WHEEL DRIVE TRANSMITTING MECHANISM

Kai H. Hansen, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 9, 1976, Ser. No. 656,115
Int. Cl.² B60K *17/30*
U.S. Cl. 180—44 R **3 Claims**



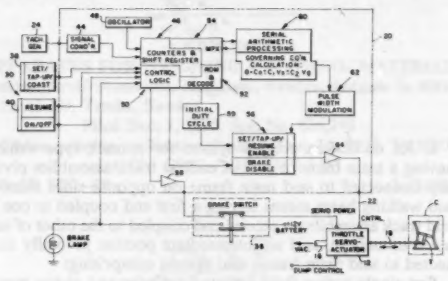
1. In a vehicle having a sprung mass portion including a vehicular frame, and an unsprung mass portion including steerable road wheels, each of said wheels being drivingly attached to a drive spindle rotatably supported on a steering knuckle, a suspension system for said steerable road wheel comprising a steering knuckle support member including a vertical extension, said steering knuckle being pivotally connected to said steering knuckle support member so as to define a generally vertically-oriented steering axis therewith, an upper laterally extending control arm pivotally connected at the ends thereof between said frame and said vertical extension of said steering knuckle support member, a lower laterally extending control arm pivotally connected at the ends thereof between said frame and said steering knuckle support member, a drive-transfer case centrally disposed on said sprung mass portion, an angle-drive case rigidly attached to an inner surface of said steering knuckle support member, aligned openings formed in said angle-drive case and said steering knuckle support member, a drive shaft rotatably supported in said angle-drive case and extending therefrom through said aligned openings, a first universal joint located on said vertically-oriented steering axis operatively interconnecting said drive shaft and said drive spindle, bevel gear means formed on said drive shaft within said angle-drive case, a two-section drive transfer shaft interconnected by a second universal joint intermediate the overall length thereof, the rear section thereof being operatively connected by a third universal joint to said drive-transfer case, and the forward section thereof being operatively connected to said bevel gear means in said angle-drive case for effecting driving rotation of said steerable road wheel via said drive shaft, a tubular torque reaction member encasing said forward section of said two-section drive transfer shaft and secured at the forward end thereof to said angle-drive case, a bracket secured adjacent the rear end of said forward section, an arcuate-shaped arm fixedly secured at one end thereof to said bracket and pivotally secured at the other end thereof by pivot pin means to said side rail, the axis of said pivot pin means extending through the center of said second universal joint, a retainer cup fixedly secured to said frame, and a shock absorber disposed between said retainer cup and flange means formed on one of said angle-drive case and said steering knuckle support member rearwardly of said vertically oriented steering axis and rearwardly of said upper control arm for effecting primary suspension of said sprung mass portion relative to said unsprung mass portion.

4,046,213

CONTROL SYSTEM AND METHOD FOR CONTROLLING VEHICLE SPEED

Gerald L. Larson, Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 23, 1976, Ser. No. 660,290
Int. Cl.² B60K *31/00*
U.S. Cl. 180—105 E **16 Claims**



1. A control system for a vehicle road speed regulator of the type having an actuator connected to the vehicle throttle for controlling the vehicle about a speed selected by the vehicle operator, said control system comprising:

a. means operable upon actuation by the vehicle operator to activate the regulator;

b. means operable in response to said activating means to sense vehicle speed;

c. means responsive to said speed sensing means and operable upon selective actuation by the vehicle operator to register said sensed speed to provide said selected speed;

d. means operable to generate a control signal having certain characteristics thereof varied in response to deviation of the vehicle speed from said selected speed;

e. said means operable to register said selected speed includes means operable upon selective actuation by the vehicle operator to increment said sensed speed a predetermined increment and means responsive to said incrementing means operable to register said incremental speed as said selected speed; and,

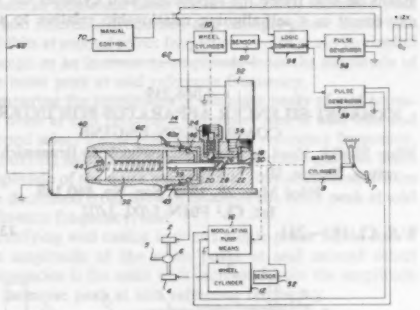
f. means responsive to said control signal and adapted to move the vehicle throttle upon connection thereto for controlling the vehicle speed above said selected speed.

4,046,214

BRAKE PRESSURE MODULATOR AND SYSTEM

Carmeli Adahan, Berkeley, Calif., assignor to Aspro, Inc., Westport, Conn.

Filed Aug. 13, 1976, Ser. No. 713,799
Int. Cl.[2] B60T 8/02
U.S. Cl. 180—109 34 Claims



1. Solenoid-operated modulator means for modulating the brake pressure of a motor vehicle having a master cylinder, and a plurality of wheel brake cylinders associated with the wheels, respectively, of the vehicle, comprising

a. a valve body containing a pumping chamber and including inlet and first outlet ports communicating with said pumping chamber, said inlet and first outlet ports being adapted for communication with said master cylinder and with one of said wheel cylinders, respectively, said valve body also including a normally open first by-pass passage directly connecting said inlet and first outlet ports to by-pass said pumping chamber;

b. first check valve means normally isolating said first outlet port from said pumping chamber, and second check valve means normally isolating said pumping chamber from said inlet port;

c. a reciprocatory pumping member extending at one end through a bore contained in said valve body and terminating in said pumping chamber;

d. main solenoid means alternately operable between energized and de-energized conditions for reciprocating said pumping member, said main solenoid means including

1. a stator rigidly connected with said valve body;

2. a linearly movable armature connected with the other end of said pumping member for linear displacement relative to said stator between first and second end positions, thereby to effect relatively large stroke pumping operation;

3. main spring means biasing said armature toward one of said end positions; and

4. resilient abutment means arranged for compression by said armature when said armature is in its other end position, thereby to increase the pumping pressure produced by said pumpig member with relatively small stroke operation of the armature when the pressure of said main spring means is overcome by the fluid back pressure appearing at the outlet port;

e. first by-pass control means for closing said first by-pass passage; and

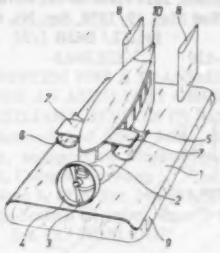
f. means for alternately energizing and de-energizing said solenoid means, thereby to reciprocate said pumping member, whereby when said by-pass is in the closed condition, fluid is pumped from said inlet port to said first outlet port.

4,046,215

VESSEL MOBILE ON AIR CUSHION OR THE LIKE

Esko Hietanen, Paattistentie 141, Turku, Finland; Ari Hietanen, deceased, late of Turku, Finland, and by Margo-Ritta Hietanen, heiress, Riutojankatu 1 aA 183, Turku, Finland

Filed Sept. 30, 1975, Ser. No. 618,140
Claims priority, application Finland, Oct. 4, 1974, 2905/74
Int. Cl.[2] B60V 1/00
U.S. Cl. 180—116 6 Claims



1. An air cushion vehicle comprising

a. a hull;

b. means for supporting said hull on an air cushion;

c. a cabin having vertical side walls mounted on said hull, said side walls being curved in a longitudinal direction to form a teardrop shape for said cabin;

d. a propeller arranged in front of said cabin, said side walls guiding the flow of air from said propeller rearwardly; and

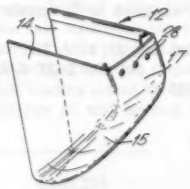
e. at least one obstructing plate pivotally mounted on each said side wall for movement between a horizontal and vertical position, each said plate when moved from said horizontal position capable of disturbing the flow of air around the respective side wall to cause a pressure differential on said cabin to assist in steering the vehicle.

4,046,216

SEGMENT FOR SEGMENTED SKIRT OF A GAS CUSHION VEHICLE

Robert Alastair Cook, Southampton, England, assignor to Mackley Ace Limited, Brighton, England

Filed Mar. 11, 1976, Ser. No. 665,942
Claims priority, application United Kingdom, June 10, 1975, 24818/75
Int. Cl.[2] B60V 1/16
U.S. Cl. 180—127 21 Claims



1. A point for forming part of a segmented flexible skirt for use on craft, vehicles or devices which can be supported on a cushion of pressurized fluid, comprising a sheet of flexible material folded into a substantially U-shape in plan view to form a curved front wall portion having an upper end and side wall portions having an upper end and a bottom end, said wall portions in side elevation tapering from their said upper end towards their said bottom end, an upper portion of said front wall portion which extends from said upper end of the front wall portion being in a plane which lies at an angle relative to

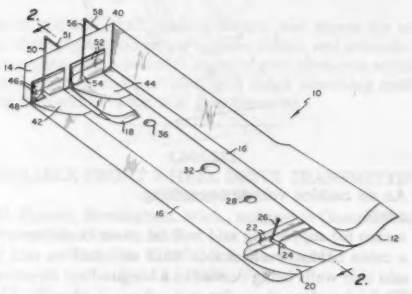
the remainder of the front wall portion, each side wall being provided adjacent its upper end with a pleat or tuck to bring said upper portion of the front wall portion into said plane, said pleat or tuck having overlapping portions which are secured together.

4,046,217

ROLL, PITCH, AND HEAVE STABILIZATION DEVICE FOR AIR-CUSHION-BORNE VEHICLES

Allen H. Magnuson, 2014 Hanover St., Silver Spring, Md. 20910

Filed Mar. 19, 1976, Ser. No. 668,370
Int. Cl.² B63B *1/36*
U.S. Cl. 180—126 **11 Claims**



1. In an air cushion vehicle having a main air cushion enclosed by an upper platform, fixed side walls and inflatable planing seals at the ends, a system for stabilizing the vehicle comprising:

a source of pressurized air;

means within said vehicle for distributing the air from said source to maintain said main air cushion and to inflate said planing seals, said inflated planing seals exerting a force between the water surface and the upper platform proportional in strength to the air pressure within the seal;

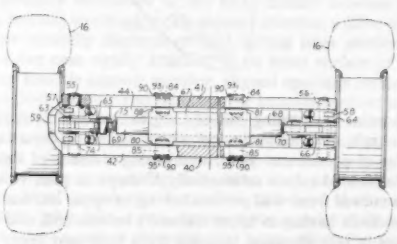
control means responsive to the position of a trailing edge of each of said planing seals to control the relative air pressure between the inside of said planing of said planing seals and said main air cushion in such a manner that the vertical and rotational movements of the vehicle relative to the water surface as a whole over the area underneath said vehicle are dampened and minimized.

4,046,218

FLOATING STEERING AXLE

Donald S. Blaisdell, Dallas, Oreg., and Llewellyn L. Walter, Perry, Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Aug. 23, 1976, Ser. No. 716,741
Int. Cl.² B62D *5/10*
U.S. Cl. 180—155 **12 Claims**



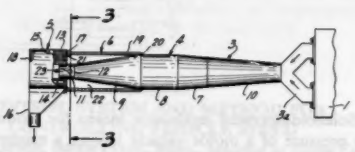
1. In a steering axle for a vehicle, said steering axle having a frame with an upper member, a lower member and front and rear web members joining said upper and lower members, a king pin at each end portion of said frame extending between said upper and lower members, a steering knuckle pivotally mounted on each of said king pins and having a wheel rotatably mounted on an outwardly projecting spindle portion thereof, a tag link connected to an extended portion of each of said knuckles, a steering cylinder carried between said upper and lower members, a double ended rod extending from said cylinder and having ends connected to said tag links, and means on said frame for supporting said cylinder for vertical movement in a self-aligning relationship relative to said tag links.

4,046,219

EXHAUST SILENCER APPARATUS FOR INTERNAL COMBUSTION ENGINE

Nisar Shaikh, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Mar. 20, 1975, Ser. No. 560,148
Int. Cl.² F01N *5/00, 5/02*
U.S. Cl. 181—211 **13 Claims**



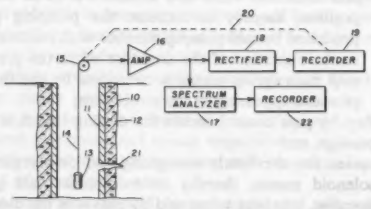
1. An exhaust system for an internal combustion engine operating at an RPM in excess of about 6000 revolutions per minute, comprising an exhaust passageway means having an exhaust pipe means with a large inlet end portion and a progressively reduced passageway section to a small discharge end portion, a conduit secured to said small discharge end portion, a cylindrical cavity means secured in encircling relation to said reduced passageway section and said conduit, and a common input and output coupling passageway means between said conduit and said cavity means and providing the only flow into and out of the exhaust passageway means to the cavity means, said coupling passageway means being defined by openings in the conduit, said openings having a length of the thickness of the conduit and selected of a selected area and being located at essentially the smallest cross-section of the passageway means whereby said cavity means defines a dead-ended resonant cavity operable to attenuate noise frequencies of the exhaust gas pressure waves.

4,046,220

METHOD FOR DISTINGUISHING BETWEEN SINGLE-PHASE GAS AND SINGLE-PHASE LIQUID LEAKS IN WELL CASINGS

Edwin E. Glenn, Jr., Dallas, Tex., assignor to Mobil Oil Corporation, New York City, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,895
Int. Cl.² G01V *1/40*; E21B *47/12*
U.S. Cl. 181—105 **15 Claims**



1. A method of distinguishing between single-phase gas and

single-phase liquid leaks through or behind the casing of a well, comprising the steps of:

a. monitoring acoustic noise generated by a casing leak within a well,

b. producing an electrical signal representative of said monitored acoustic noise,

c. measuring the frequency spectrum of said electrical signal,

d. selecting a reference frequency within said measured frequency spectrum above which a single-phase gas leak exhibits at first select frequencies noise peaks having decrease in amplitude from the amplitude of the noise peak at said reference frequency and a single-phase liquid leak exhibits at second select frequencies noise peaks having no change or an increase in amplitude from the amplitude of the noise peak at said reference frequency,

a. comparing the amplitudes of the noise peaks of said acoustic noise at said reference frequency and at said first and second select frequencies above said reference frequency,

f. identifying said casing leak as a single-phase gas leak if the amplitude of the noise peaks at said first select frequencies are decreased from the amplitude of the noise peak at said reference frequency, and

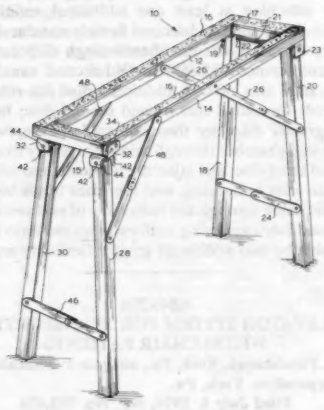
g. identifying said casing leak as a single-phase liquid leak if the amplitude of the noise peaks at said second select frequencies is the same or is increased from the amplitude of the noise peak at said reference frequency.

4,046,221

SADDLE SUPPORT

Neal M. Edenfield, Rte. 1, Box 178, Grand Ridge, Fla. 32442

Filed Mar. 17, 1976, Ser. No. 667,603
Int. Cl.² F16M *11/00*
U.S. Cl. 182—155 **8 Claims**



1. A support for saddles or the like comprising:

a pair of rails, one rail extending substantially parallel with respect to the other rail;

a first pair of support legs;

a first foldable brace between said first pair of legs;

means connected to both of said rails for sliding and pivoting said first pair of legs together, such that said first pair of legs are foldable into a first plane adjacent to said two rails;

a second pair of support legs, a first one of said second leg pair coupled to an end of one of said rails and the other of said legs in said second pair coupled to an end of said other rail, said second leg pair coupled to said rails and ends thereof opposing said first leg pair;

a second foldable brace between said second pair of legs;

a double-action pivot hinge connecting each leg of said second pair to the corresponding rail for pivoting each said leg of said second pair both in a second plane transverse to said first planes, each leg of said second leg pair being pivotable in said second plane about a pivot axis passing through the corresponding rail; and wherein

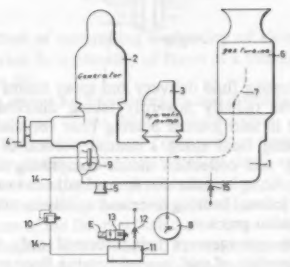
said second pair of support legs are foldable into said first plane with said first leg pair positioned there between, both said leg pairs and said second brace being dimensioned such that said second brace overlies said first leg pair when said leg pairs are folded in said first plane, whereby said first leg pair must be folded into said first plane prior to folding of said second leg pair into said first plane.

4,046,222

PRESSURE SYSTEM FOR A TRANSMISSION, ESPECIALLY FOR AN AUXILIARY GEARBOX FOR DRIVING AUXILIARY DEVICES IN AIRCRAFT

Karl Skrivanek, Oberursel, and Klaus Janek, Bad Homburg, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed June 9, 1975, Ser. No. 585,302
Claims priority, application Germany, June 7, 1974, 2427634
Int. Cl.² F01M *1/00*
U.S. Cl. 184—6.11 **6 Claims**



1. In combination with a transmission and a housing containing the latter, especially an auxiliary gearbox for driving auxiliary devices in aircraft, an inlet pressure chamber, check valve means connected to said inlet pressure chamber and operable in open condition to establish communication of the atmosphere with said inlet pressure chamber, compressed air generating means having a suction side adapted to communicate with said inlet pressure chamber and also having a pressure side adapted to communicate with the interior of said housing, separating means operable to separate oil from air associated therewith, conduit means having said separating means interposed therein and leading from said housing to said inlet pressure chamber, a pressure holding valve interposed in said conduit means between said separating means and said inlet pressure chamber, and safety valve means communicating with said housing means and being operable in response to an excessive pressure within said housing means to establish communication between the interior of said housing means and the atmosphere.

4,046,223

BEARING SUMP COOLING ARRANGEMENT

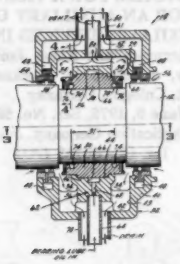
James D. McHugh, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 15, 1975, Ser. No. 622,628
Int. Cl.² F01M *9/10*
U.S. Cl. 184—6.11 **3 Claims**

1. A turbomachine having a shaft, a journal bearing rotatably supporting said shaft, housing means enclosing and supporting said journal bearing and having an inner wall defining a sump chamber around said journal bearing, meand for delivery of a flow of lubricating fluid to said journal bearing and for

sequentially spraying said flow of lubricating fluid against the inner wall of said housing means defining said sump chamber in a manner whereby the inner surface of said sump chamber is continuously wetted and thereby cooled by the lubricant flow, said means for delivery of lubricating fluid to the bearing and for sequentially spraying the lubricant flow including means for collecting the lubricant flow after use for lubricating purposes and before exiting said bearing, and a plurality of spray passageways formed in said bearing and communicating with said collection means,

said journal bearing comprising an annular liner carried by said housing means and extending around a journal formed on said shaft,



said lubricating fluid delivery and spray means including at least one radially inwardly facing distribution groove formed in said journal bearing liner for distributing the lubricating fluid along a central portion of the journal bearing, said collection means comprising a radially inwardly facing annular slot formed adjacent each axial end of said journal bearing liner and axially outwardly of said distribution grooves,

said spray passageways being formed only through the upper portion of said journal bearing liner so as to spray the flow of lubricating fluid on the upper portions of the inner wall, the lower portions of the inner wall being bathed by gravity flow of said lubricating fluid.

4,046,224

APPARATUS FOR LUBRICATING THE GRIPPER BAND OF A SHUTTLELESS LOOM

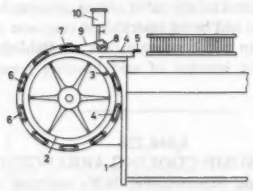
Viktor Smutny, Wetzikon, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, ZH, Switzerland

Filed Dec. 9, 1975, Ser. No. 639,186

Claims priority, application Switzerland, Dec. 24, 1974, 17253/74

Int. Cl.² F16N 7/12, 7/24

U.S. Cl. 184—15 R **4 Claims**



1. Apparatus for lubricating a gripper band carrying an oscillating weft yarn inserting element for weft yarn insertion in the shed of a shuttleless loom, comprising a roller body of absorptive material suitable for impregnation with lubricant, a shaft supporting said roller body, said shaft being hollow and provided with radial holes, said lubricant being fed to said hollow shaft and therefrom through said holes to said absorptive material, said shaft being disposed transversely to the direction of movement of the gripper band, and said roller body being adapted to be operatively connected to the loom, resiliently biased against the upper side of the gripper band and driven by it.

4,046,225

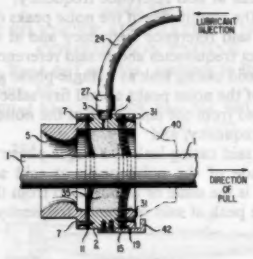
CABLE LUBRICATION METHOD

Walter James Shenk, Millington, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 11, 1975, Ser. No. 603,279

Int. Cl.² F16N 7/00

U.S. Cl. 184—15 R **5 Claims**



1. A method for applying lubricant to the surface of a cable comprising the steps of attaching spaced first and second flexible annular discs each having a plurality of radial slits cut therethrough disposed along its inner circumference to a housing forming a chamber between said discs, the inner circumferences of said discs defining a cable passageway through said chamber; attaching at least one additional annular disc of greater flexibility than said second flexible annular disc having a plurality of radial slits cut therethrough disposed along its inner circumference adjacent to said second annular disc so that the radial slits of said additional disc are rotatably displaced from the radial slits of said second disc; feeding said cable of greater diameter than said cable passageway in said discs into said chamber through said passageway from said first disc to said third disc; and injecting lubricant into said chamber through an inlet in housing, said lubricant beads being deposited on said cable through the radial slits of said second annular disc and said lubricant being uniformly spread onto the surface of said cable by said additional greater flexibility annular disc.

4,046,226

ELEVATOR SYSTEM FOR TRANSPORTING WHEELCHAIR PATIENTS

Henry K. Flinchbaugh, York, Pa., assignor to Flinchbaugh-Murray Corporation, York, Pa.

Filed July 8, 1976, Ser. No. 703,636

Int. Cl.² B66B 9/08

U.S. Cl. 187—12 **12 Claims**

1. An elevator system comprising:

a. at least one track means including,

i. a first tubular member having a longitudinal slot along an upper first surface, and

ii. a lower second tubular member within and along a second surface of said first member opposite said first surface;

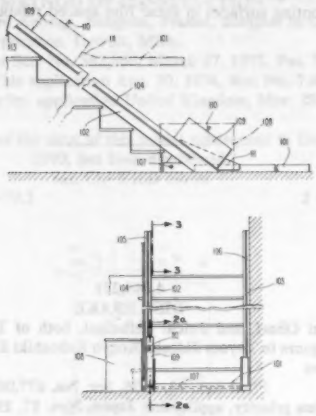
b. trolley means within the first tubular member of said track means, said trolley means having an upper roller means bearing against the inside of said first surface of said first tubular member, and a lower roller means bearing against an upper outer surface of said second tubular member;

c. an elevator platform connected to and movable with said trolley means through said slot in said first tubular member; and

d. a continuous chain drive including,

i. drive means at an extremity of said track means, and

ii. a chain, powered by said drive means and having its ends respectively connected to opposite ends of said



trolley means, said chain passing through said second tubular member and providing upward and downward movement for said platform.

4,046,227

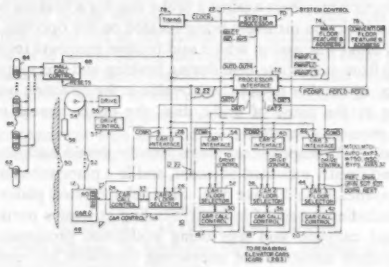
ELEVATOR SYSTEM

Andrew F. Kirsch, Edison, N.J., and Charles L. Winkler, Worthington, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 503,146, Sept. 4, 1974, abandoned. This application May 5, 1975, Ser. No. 574,662

Int. Cl.[2] B66B *1/20*

U.S. Cl. 187—29 R **34 Claims**



1. An elevator system for a structure having a plurality of landings, comprising:

a plurality of elevator cars,

means mounting said plurality of elevator cars for movement relative to the landings,

up and down hall call registering means for registering calls for elevator service in the up and down directions, respectively, from at least certain of the landings,

averaging means providing a first average responsive to the number of registered up and down hall calls in the structure and the number of in-service elevator cars, and a second average responsive to the number of up and down hall call registering means in the structure and the number of in-service elevator cars,

and control means for assigning service directions from landings to said elevator cars, said control means making a general assignment to at least certain of said elevator cars which starts at a car and proceeds in a selected direction therefrom, assigning unassigned service directions from landings only to this car until the second average is met, skipping landings having registered hall calls if the first average is met before the second average.

4,046,228

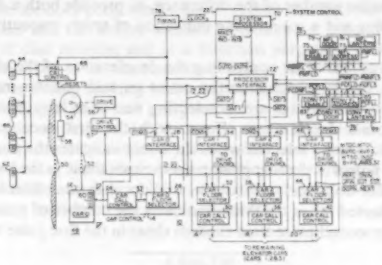
ELEVATOR SYSTEM

Bruce A. Powell, Franklin Borough, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 5, 1975, Ser. No. 574,663

Int. Cl.[2] B66B *1/18*

U.S. Cl. 187—29 R **11 Claims**



1. A method of controlling a plurality of elevator cars to provide service for a plurality of floors of a building, comprising the steps of:

providing means for registering up and down hall calls from at least certain of the floors of the building,

assigning the various up and down service directions of the floors by dividing them among all of the in-service elevator cars according to a predetermined strategy,

periodically clearing those assigned up and down service directions of the floors which do not have a registered hall call associated therewith, and also an assigned up or down service direction of a floor which has a hall call associated therewith which is located behind the advanced position of the elevator car it is assigned to,

and reassigning the up and down service directions from the floors cleared in the clearing step, by dividing them among all of the in-service elevator cars according to the predetermined strategy.

4,046,229

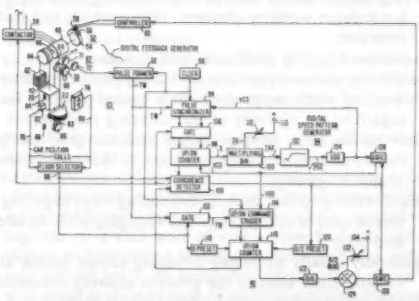
ELEVATOR SYSTEM

Andreas Kernick, Murrysville, Pa., and Manvel A. Geyer, Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 12, 1975, Ser. No. 640,303

Int. Cl.[2] B66B *1/30*

U.S. Cl. 187—29 R **12 Claims**



1. An elevator system, comprising:

an elevator car to be stopped at a predetermined stopping point,

first means providing a first train of pulses responsive to the movement of the elevator car, with each pulse indicating a predetermined increment of car movement,

second means providing a second train of pulses responsive to the desired movement of the elevator car from increment to increment up to the stopping point,

counter means responsive to said first and second trains of pulses such that its output count indicates which pulse train has produced the greater number of pulses, and the precise number of the difference, to provide both a qualitative and a quantitative indication of error, respectively, and

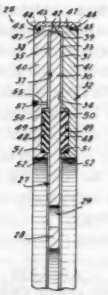
control means for controlling the deceleration of the elevator car in response to the count on said counter means, with the control means selecting one of at least first and second deceleration efforts, with the first deceleration effort being selected when the count indicates the number of pulses in the first pulse train exceeds those in the second pulse train, and with said second deceleration effort being selected when the count indicates the number of pulses in the second pulse train exceeds those in the first pulse train.

4,046,230

TUNED TORSIONAL VISCOUS DAMPERS

William J. Troyer, Orchard Park, N.Y., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed July 14, 1976, Ser. No. 705,158
Int. Cl.² F16F 15/12
U.S. Cl. 188—1 B **28 Claims**



22. A tuned torsional viscous damper, comprising:

supporting disk means having a radially extending circular body with a radially inner hub portion adapted to be secured to a rotary member such as a crankshaft subject to vibrations to be damped by the damper;

a ring shaped inertia mass having a radially inwardly opening annular working chamber within which said body is received;

a viscous damping medium in said chamber;

said body and said inertia mass having parallel confronting working surfaces in shear film spaced relation having regard to the viscosity of said damping medium;

said inertia mass having coaxial annular grooves facing axially toward said body adjacent to the radially inward chamber opening;

elastic tuning spring, spacing and sealing rings engaging said inertia mass in said grooves and engaging with surfaces on said body;

generally axially extending retaining flange means at the radially inner sides of the grooves assuring concentricity and protective enclosure of said elastic rings;

said circular body having axially extending flange means;

and said inertia mass having axially extending groove extension from said working chamber into which said flange means project;

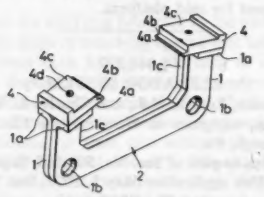
said flange means and said groove extensions having confronting surfaces in shear film spaced relation.

4,046,231

DISC BRAKE

Harumi Ohori, and Juichi Shibatani, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 14, 1976, Ser. No. 677,002
Claims priority, application Japan, Nov. 17, 1975, 50-137248
Int. Cl.² F16D 65/02
U.S. Cl. 188—71.1 **3 Claims**



1. In a disc brake of the type in which floating type calipers urge friction members against a brake disc for a braking action with said friction members being located on the opposite sides of said brake disc and in which said friction members receive a torque from said brake disc during braking and are supported on a fixing member so as to be movable in the direction perpendicular to the plane of brake disc, the improvement in the fixing member comprising:

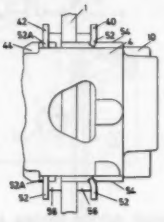
a pair of U-shaped steel plates fixedly joined back-to-back and fixedly mounted adjacent, and in a plane substantially parallel, to said brake disc, said U-shaped steel plates each including a pair of legs surrounding at least a portion of said calipers, said legs being positioned proximate said friction members and interacting therewith for receiving torque during braking, the legs of each of the pairs of U-shaped steel plates terminating in a pair of end portions bent outwardly in opposing direction to form a pair of flanges in substantially the same plane, the outer surfaces of said flanges being substantially perpendicular to the plane of the plate, said joined pair of plates being fixedly mounted with a pair of like sides of said pair of flanges extending over said brake disc, guide members individually and rigidly secured to the outer surfaces of said associated pairs of said flanges covering substantially the entire transverse width of said outer surfaces of the flanges of said torque-receiving legs for supporting said calipers for movement perpendicular to the plane of said brake disc, said torque being received directly by at least one of said legs, and means for restraining radial movement of said calipers with respect to said disc, said restraining means being individual plates mounted rigidly on said guide members with said calipers being slidably movable between cooperating ones of said guide members and said plates.

4,046,232

DISC BRAKE SLIDING CALIPER ASSEMBLY WITH BRAKE PADS OF A COMMON PATTERN, AND METHOD OF CONSTRUCTION

George Edward Kellogg, Bougival, France, assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 562,850, March 27, 1975, Pat. No. 3,997,034. This application Aug. 30, 1976, Ser. No. 718,532
Claims priority, application United Kingdom, Mar. 28, 1974, 13743/74
The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.
Int. Cl.[2] F16D *69/04*
U.S. Cl. 188—73.1 3 Claims



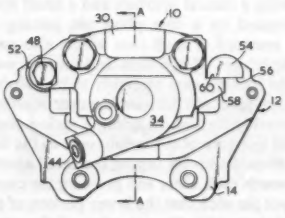
1. In a disc brake caliper assembly comprising:
a caliper body having a spaced pair of limbs joined by a bridge section, guide surfaces including ledges at either side of the caliper bridge section between said limbs, and a pair of brake pads of one pattern, said pads being supported by said ledges, each of said brake pads including a backing plate and a lining segment;
each of said backing plates having ears arranged to rest on said ledges with the space between said ears, when said ears are within the side surface planes of their respective backing plates, being such that said ears would have an interference fit with and therefore clinch tightly to said caliper bridge section; the ears of one of said brake pads being bent out of the planes of its backing plate side surfaces to permit sliding movement of said one brake pad on said guide surfaces, the ears of the other of said brake pads clinching tightly to said caliper bridge section at one limb with the backing plate thereof in brake applying force engagement with said one limb, said arrangement permitting the use of one brake pad pattern for both brake pads.

4,046,233

SLIDING CALIPER DISC BRAKE

Horst Willi Klassen, St. Sebastian, Germany, assignor to Girling Limited, Birmingham, England

Filed Jan. 27, 1976, Ser. No. 652,737
Claims priority, application United Kingdom, Feb. 1, 1975, 4444/75
Int. Cl.[2] F16D *65/02*
U.S. Cl. 188—73.3 6 Claims



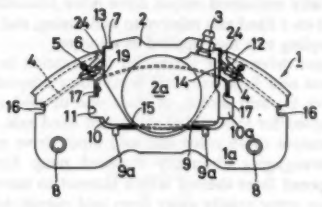
1. A sliding caliper disc brake comprising a torque member, a caliper member slidably mounted on the torque member for straddling a minor portion of the periphery of a rotatable disc, and an actuator for directly urging a friction pad against one side of the disc to cause the caliper member to slide relative to the torque member to apply by reaction an opposite friction pad onto the other side of the disc, the torque member having portions adapted to receive directly from both pads all circumferential drag forces experienced by the pads on brake actuation, connecting means between the caliper member and the torque member constructed and arranged to permit sliding of the caliper member only in a direction parallel to the axis of disc rotation and also pivoting of the caliper with respect to the torque member, means for restraining said pivoting comprising complementary sliding surfaces on the caliper member and torque member permitting relative sliding between the caliper member and the torque member in a direction parallel to the axis of disc rotation and in a direction perpendicular to said direction so as to accommodate deformation of the torque member during braking without transfer of drag forces to said connecting means, said complementary sliding surfaces being arranged to limit said pivoting of the caliper member in a direction radially outwardly of the disc, and means for resiliently biasing the complementary sliding surface on the caliper outwardly into direct sliding engagement with the complementary surface on the torque member.

4,046,234

DEVICE FOR GUIDING A CALIPER IN A DISK BRAKE

Masayuki Kurata, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,537
Int. Cl.[2] F16D *65/32*
U.S. Cl. 188—73.3 1 Claim



1. A disk brake comprising:
a rotatable brake disk having a front and a rear surface;
an inverted U type fixed member extending over an outer peripheral portion of said brake disk and having interconnected wall plates disposed parallel to said front and rear surfaces of said brake disk;
friction pads guided and supported on a bottom portion of a concavity formed on a middle portion along an upper edge of said fixed member, and concavity defining V-type notch grooves at upper portions of both side edges of said concavity;
a guide member retained in each of said notch grooves and having opposite ends, each of said ends laterally extending from said fixed member;
a caliper body having projections of a V-type in section and slidably supported within said V-type notch grooves, each of said projections defining an upper and a lower sliding surface;
a pair of associated springs retained by said fixed member to support said lower surface of each of said projections; and
an anticorrosive sliding metal plate fixedly placed on each of said projections, said sliding metal plate having a horizontal shoulder positioned on a shoulder portion formed on a top end of a side wall of said caliper body, a vertical sliding surface placed in abutment with said side wall of said caliper body, an inclined sliding surface placed on said upper surface of each of said projections and being in abutment with a bottom surface of said guide member and a pair of tongues downwardly extended from the opposite

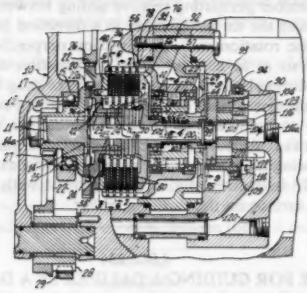
edges of said inclined sliding surface to hold a front and a rear end of each of said projections of said caliper body.

4,046,235

AUTOMATIC LOAD BRAKE

Donald P. Shutt, Long Beach, Calif., assignor to Western Gear Corporation, Lynwood, Calif.

Filed Apr. 19, 1976, Ser. No. 677,879
Int. Cl.[2] B60T 7/12
U.S. Cl. 188—134 23 Claims



1. An automatic load brake of the Weston class, using a drive motor, and adapted for coupling to a load imposed as a torque, comprising:

an external casing,

an axially restrained output drive rotor journalled for rotation on a fixed axis relative to said casing, and adapted for coupling to a load applied as a torque,

an input drive rotor journalled for rotation in said casing about said fixed axis, said input rotor adapted for rotary drive by said motor, at least one of said rotors being adapted for axial travel along said fixed axis,

said output drive rotor and said input drive rotor having interengaging circularly disposed ramp formations on opposed faces thereof which interact to move said input drive rotor axially away from said output drive rotor in relative rotation in one direction of said rotors, and which allow said input drive rotor to return axially toward said output drive rotor in relative rotation in the opposite direction of said rotors,

opposed, longitudinally splined hubs on said rotors,

a plurality of brake plates, at least one of said plates being splined on said hub of said output rotor and at least one of said plates being splined on said hub of said input rotor,

means on the side of said input drive rotor, opposite from the side thereof having said ramps, providing a plane brake pressure surface facing toward said brake plates,

means on said output drive rotor providing a plane brake reaction surface facing toward said plane brake pressure surface,

friction brake disks intervening in spaces between, and engageable with, said brake plates, and intervening also between and engageable with the end brake plates and said brake pressure reaction surfaces,

disk guide means engaging and coacting with guide formations on said friction disks for guiding them generally axially;

a one-way rotary holding means for reacting between said disk guide means and said casing to permit rotation of said friction disks and brake plates, in the incoming direction of rotation of said rotors, and to lock said disk guide means and friction disks and plates against rotation relative to said casing in the outgoing direction of rotation of said rotors; and

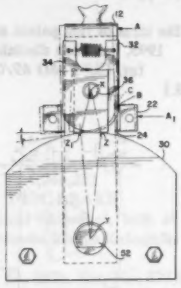
means for urging said rotors to return axially toward each other in response to said opposite rotation of said rotors.

4,046,236

LOCKING CONTROL DEVICE

Gordon L. Hershman, La Grange, and Arthur S. Datta, Willow Springs, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Apr. 1, 1976, Ser. No. 672,818
Int. Cl.[2] F16D 67/00
U.S. Cl. 192—8 R 2 Claims



1. A locking control device having an input arm and an output means for communicating motion irreversibly from the input arm to the output means further comprising:

an arcuate locking plate with a top edge, the locking plate having a plurality of apertures including mounting apertures and a central aperture;

an input arm having an aperture at a lower end thereof and further being formed at an upper end with a projection perpendicular to the major plane of the input arm, the upper end further equipped with an aperture for accommodating an operating handle;

a U-shaped bracket affixed to the input arm between the lower end thereof and the upper end thereof in position where the arms of the U-shaped bracket project perpendicularly from the input arm in the direction opposite the direction of the upper end of the input arm;

a first and a second output arm having an aperture at each end thereof with the aperture at the upper end thereof circular in shape and the aperture at the lower end thereof semicircular in shape;

a pivot assembly for receiving the first and second output arms, having an output shaft having a flat portion extending from a first end of the output shaft towards a second end of the output shaft compatible in shape with the semicircular aperture of the output arms, the output shaft further being threaded at the first end thereof as well as an aperture through the first end thereof, the pivot assembly further including a pivot support for supporting the output shaft and a hub to further support the output shaft as well as the pivot support, and a castellated nut carried on the threaded end portion to retain the output arms;

a locking cam assembly comprising an inboard cam having a central aperture and a small aperture, an outboard cam also having a central aperture and a small aperture pivotally mounted on a cam pivot pin passing through the central aperture of each cam which also passes into the upper apertures of the first and second output arm to allow the locking cam assembly to be pivotally mounted on the cam pivot pin between the output arms, the locking cam assembly further including a spring suspended from the small aperture of the output cam to the small aperture of the inboard cam for urging the small apertures of each cam towards each other and pivoting the cams around the cam pivot pin such that the lower portion of each cam will be in contact with the top edge of the arcuate locking plate;

a cam pivot pin retainer strip affixed to the outboard end of the legs of the U-shaped bracket to retain the cam pivot

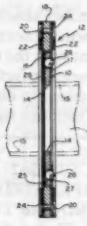
pin in the apertures of the output arms, whereby movement of the input arm will cause the U-shaped bracket to urge one of the cams out of contact with the arcuate locking plate and will then contact the output arms and displace them in accordance with the movement of the input arms.

4,046,237

CLUTCH WITH TORQUE LIMITING BRAKE

Robert S. Root, Syracuse; Frederick P. Taylor, Bridgeport, and William J. MacKendrick, Syracuse, all of N.Y., assignors to Lipe-Rollway Corporation, Syracuse, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,374
Int. Cl.² F16D *7/06, 67/02*
U.S. Cl. 192—13 R **5 Claims**



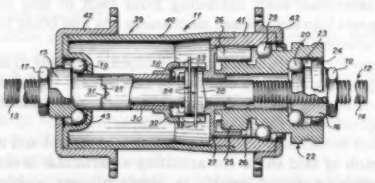
1. In a friction clutch for connecting driving and driven shafts, the clutch including a release mechanism for effecting disengagement of the clutch, a clutch brake cooperable with the release mechanism and a stationary surface adjacent the clutch comprising an inner annular plate having an aperture, the plate being keyed to the driven shaft, means encircling the inner annular plate and arranged to be moved by the release mechanism into engagement with the stationary surface during disengagement of the clutch, the encircling means including a flexible annular plate having a ring of apertures on the same radius as the inner annular plate aperture, and means yieldably connecting the encircling means to the inner annular plate including at least one ball positioned in the inner plate aperture, the diameter of the ball being greater than the thickness of the inner plate whereby the ball projects into one of the apertures in the flexible annular plate of the encircling means, the ball being movable from one flexible plate aperture to another to permit relative movement between the encircling means and inner annular plate when the force applied to the encircling means by the release mechanism exceeds a predetermined amount.

4,046,238

FREE-WHEELING MECHANISM FOR BICYCLES

Hector Mendoza-Orozco, Adolfo Prieto 1709, Mexico 12, D. F., Mexico

Filed Feb. 3, 1976, Ser. No. 655,033
Int. Cl.² F16H *15/00*
U.S. Cl. 192—45 **4 Claims**



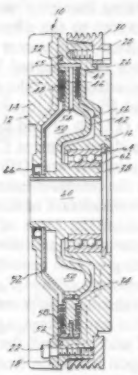
1. A free wheeling mechanism for a bicycle comprising an axle; first and second fixed bearing cones mounted on respective end portions of said axle; a movable cone formed with a recess accommodating said first cone, said movable cone and said first fixed cone defining a first raceway; a hub through which said axle extends and which surrounds said second fixed cone and said movable cone, said hub and said second fixed cone defining a second raceway and said hub and said movable cone defining a third raceway; ball bearings running in said raceways, whereby the movable cone is rotatable with respect to the axle and the hub is rotatable with respect to both the axle and the movable cone; rollers positioned between the movable cone and the hub and displaceable between a position in which they couple the movable cone to the hub and a position in which they do not couple the movable cone to the hub; a guide device for retaining said rollers between the movable cone and the hub, said guide device having an annular portion defining an opening through which the axle extends; holding means having a sleeve mounted on the axle with one end coupled to one of said fixed cones, a cup fixed to the other end of the sleeve, which cup houses the annular portion of said guide device, and resilient connecting means for connecting said cut with said annular portion; and a helical spring urging the annular portion of said guide device towards the movable cone.

4,046,239

VISCOUS DRIVEN OVERRUNNING CLUTCH

Thomas H. Tinholt, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 6, 1976, Ser. No. 683,852
Int. Cl.² F16D *31/00*
U.S. Cl. 192—58 B **7 Claims**



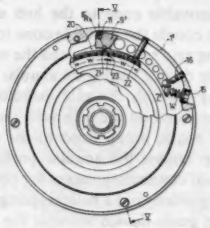
1. A viscous drive coupling comprising:
a housing member defining a working chamber;
a circular member rotatably mounted within the working chamber;
opposed surfaces located on the housing member and circular member and defining a shear space therebetween;
a fluid shear means within the coupling to cooperate with the opposed surfaces to provide a fluid shear-type drive between the housing member and circular member;
a fluid reservoir located within one of the members and in fluid communication with the shear space;
flow directing means on one of the members adapted to draw fluid out of the reservoir into the working chamber when the angular velocity of the reservoir containing member in one rotating direction exceeds the angular velocity of the other member in the same direction and to pump fluid into the reservoir when the angular velocity of the reservoir containing member in the one rotating direction is less than the angular velocity of the other member in the same direction.

4,046,240

CENTRIFUGAL FRICTION CLUTCH

Walter Schlagmuller, Schwieberdingen, and Rudolf Babitzka, Kirchberg, Murr, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Mar. 30, 1976, Ser. No. 671,829
Claims priority, application Germany, June 27, 1975, 2528719
Int. Cl.² F16D 43/14
U.S. Cl. 192—104 C **6 Claims**



1. Centrifugal friction clutch having a drive rotary element (1) adapted for connection to a drive shaft (4) and a driven element (7), a lever shaped centrifugal element (9) subjected to centrifugal force upon rotation of the clutch, said lever shaped element (9) being a double-arm lever pivoted to rock about a pivot axis (11) essentially parallel to the drive shaft (4) and having one arm (10) facing the rotary surface of the driven element (7):

a spring (14) engaging the double-arm lever (9)

the pivot axis (11) being located a small distance (c) in advance — with respect to the direction of rotation of a location of a resultant force vector (F_R) resulting from a perpendicular force (F_N) exerted by said one arm (10) against the rotary surface (8) of the driven element (7) and the circumferential frictional force (F_U) between the engagement surface (17, 22) of said one arm and the rotary surface (8) of the drive element (7) when the clutch is engaged so that said one arm (10) of the lever (9) is in engagement with the driven element (7), resulting in self-binding, locking transmission of torque, deflection of said one arm (10) counter the force of the spring (14) upon rapid rotation of the clutch and due to increased centrifugal force (F_C) acting on said centrifugal double-arm lever (9) causing the resultant vector (F_R) to shift from behind the pivot axis (11) through the pivot axis in advance of the pivot axis and thus cause disengagement of the engagement surfaces of said arm and the circumference of the driven element upon transition from locking engagement to disengagement of the clutch;

a clutch shoe or pad (20, 22) forming the engagement surface for said one arm (10) of the lever (9);

and a floating connection (21) including a pin (21) between the shoe (20, 22) and said one arm (10) of the lever, the center line 23 of the shoe (20) parallel to the axis of rotation of the clutch being positioned between the floating pin (21) and the engagement point of the spring (14) on the lever (9).

4,046,241

OVER-RIDE MECHANISM FOR SCREW DRIVE ACTUATOR

Reginald D. Furtah, Jr., Livonia, Mich., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Mar. 24, 1976, Ser. No. 669,942
Int. Cl.² F16P 3/00
U.S. Cl. 192—150 **5 Claims**

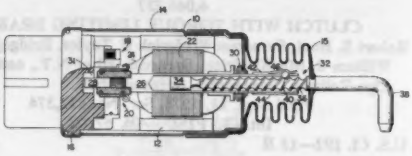
1. A mechanism for converting rotary motion into linear motion, comprising:

a housing;

a tubular member having a plurality of spaced apart apertures therein, said tubular member being mounted for rotatable movement in said housing;

a helically threaded rod member extending axially into said tubular member;

means occupying said apertures and engaging the threads on said helically threaded rod member linearly driving said rod member when said tubular member is rotated; and



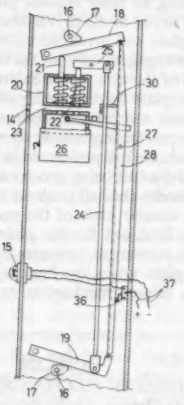
a unitary spring clip member attached to said tubular member, said spring clip member normally biasing said driving means into engagement with the threads on said rod member, said spring clip member further being yieldable so as to allow said driving means to disengage from the threads in the event said rod member jams or is over-ridden.

4,046,242

VENDING MACHINE OPERATED BY A CHECK TICKET TO RECORD USE THEREON

Allan Ahlström, Mahults Herrgard, Simlangsdalen, Sweden (31038)

Filed May 26, 1976, Ser. No. 690,198
Claims priority, application Sweden, June 2, 1975, 7415651
Int. Cl.² G07F 7/08
U.S. Cl. 194—4 R **5 Claims**



1. A vending machine having a number of compartments arranged in at least one row and a release mechanism box to one side of said at least one row,

a blocking means at each compartment,

an individual shaft extending from each of said compartments into said release mechanism box and being rotatably mounted in said machine,

means for fixedly attaching each blocking means to its corresponding shaft, an embossing mechanism within said box containing axially displaceable embossing stamps corresponding to the number of compartments,

levers within said box for operating said stamps and means at each of said shafts for actuating a particular lever,

a catching device setable in either of two positions, and adapted in one position to prevent movements of said lever,

a passage in said box adapted to permit the insertion of a check ticket having a portion of magnetically attractible

material across the path of the axial movement of said embossing stamps, and

a release mechanism for said catching device including a detent being magnetically attractible by said check ticket.

4,046,243

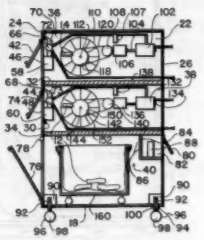
DISPOSABLE DIAPER DISPENSER VENDING UNIT

Sandra Valentine, R.R. No. 1, Norland, Ontario, Canada

Filed Aug. 3, 1976, Ser. No. 711,119

Int. Cl.² G07F *11/52*

U.S. Cl. 194—10 **8 Claims**



1. A disposable diaper dispenser vending unit adapted to dispense disposable diapers or plastic bags and to receive for storage said diapers or bags, which comprises:

a. a housing having an upper, a middle, and a lower chamber therein, and a vertically placed front wall, said front wall having a pair of apertures therein, one said aperture communicating with said upper chamber and said other aperture communicating with said lower chamber;

b. a pair of transparent doors having handles thereon, each said door hinged to said front wall within one said aperture;

c. a bin door hinged within said front wall, said bin door communicating with said lower chamber;

d. a bin member contained in said lower chamber, said bin member adapted to receive said used diapers and bags;

e. means for deodorizing said lower chamber;

f. one assembly of a coin slot, coin box, coin chute and electro-mechanical coin counter contained in each said upper and middle chambers;

g. one solenoid contained in each said upper and middle chambers;

h. one said electric motor with associated drive shaft contained in each said upper and middle chambers;

i. a clutch assembly communicating with each said drive shaft, each said solenoid communicating with each said clutch assembly;

j. a drum type dispenser assembly contained in each said upper and middle chamber;

k. each said dispenser assembly mounted for rotation on a shaft;

l. a large tooth gear mounted on each said shaft;

m. a small tooth gear mechanically communicating with each said clutch assembly;

n. a chain joining each said set of said small and large tooth gears; and

o. two electric series circuits, each said circuit consisting of one said electric motor, a power source, one said solenoid, and one said electro mechanical coin counter.

4,046,244

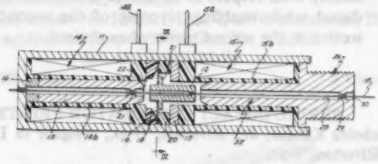
IMPACT MATRIX PRINT HEAD SOLENOID ASSEMBLY

Juan F. Velazquez, Ann Arbor, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.

Filed Aug. 6, 1975, Ser. No. 602,202

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **12 Claims**



1. A printing head driver comprising:

a printing element and a magnetically responsive armature for moving such element in response to magnetic force;

means for exerting a first force on said printing element, of a magnitude and direction to hold said element in a non-printing rest position;

spring means for providing a force directed to move the printing element away from said rest position and toward a printing position;

magnetic means for applying an actuating magnetic force to said armature, said actuating force when applied to said armature effectively counteracting said first force and additionally impelling the printing element toward a printing position in cooperation with said spring force, said actuating magnetic force and said spring force cooperatively having an effective combined force exceeding the magnitude of the first force by an amount greater than the magnitude of the spring force alone; and

means for retracting the printing element from a printing position and back to said rest position upon removal of said actuating magnetic force.

4,046,245

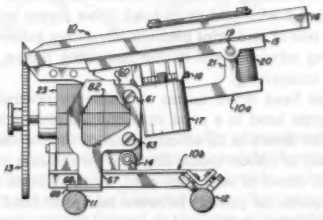
CARRIAGE STABILIZATION MEANS FOR A SERIAL PRINTER

Kenneth R. Frechette, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,125

Int. Cl.² B41J *19/00*

U.S. Cl. 197—60 **5 Claims**



1. In a serial printer having carriage mounting means enabling lateral movement of a carriage assembly along a predetermined path, located in a first plane, the carriage assembly having a first carriage section mounted to said carriage mounting means and a second carriage section pivotally mounted to said first carriage section about a pivot line wherein said second carriage section is pivotable in a second plane substantially perpendicular to said first plane, the improvement comprising:

a first member carried by a first side of said second carriage section,

a second member carried by a second and opposite side of said second carriage section, and

said first and second members engaging said carriage mounting means at respective locations which are laterally spaced from each other in the direction of said predetermined path,

whereby unwanted pivotal movement of said carriage assembly with respect to an axis in the second plane is reduced while enabling pivoting of the second carriage section in the second plane when desired.

4,046,246

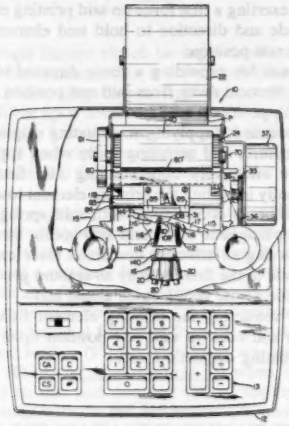
SERIAL IMPACT CALCULATOR PRINTER

Nicholas Kondur, Jr., Riverton, Wyo., assignor to LRC, Inc., Riverton, Wyo.

Division of Ser. No. 527,603, Nov. 27, 1974, Pat. No. 3,986,594. This application Oct. 14, 1976, Ser. No. 732,473

Int. Cl.² B41J *33/40*

U.S. Cl. 197—160 **9 Claims**



1. In a printing apparatus having a frame, a print head selectively actuated by actuating means associated with said head to impress characters on a recording medium, a pair of record medium advancing rollers mounted for rotation on spaced parallel axes with the external roller surfaces engageable with one another to define a common guide path for advancement of the recording medium therebetween and advancing means associated with said print head drive means to incrementally drive one of said print medium advancing rollers in a direction causing advancement of the recording means, the improvement comprising:

print head drive means rotatable to reversibly drive said print head in a print and return direction transversely of the direction of advancement of the recording medium,

a pair of ribbon spools disposed for rotation at opposite ends of travel of said print head, a print ribbon wound on said spools for passage between said print head and recording medium, each spool including ratchet means thereon to cause each spool to undergo rotation when said ratchet means are positively advanced, and

ratchet drive means pivotally mounted on said print head for travel therewith, said ratchet drive means alternately movable into engagement with one of said spools to wind said printing ribbon onto one spool and responsive to resistance of the one spool to rotation to pivot away from engagement with the one spool and into engagement with the other spool to reverse the travel of said printing ribbon whereby to unwind it from the one spool and wind it onto the other spool.

4,046,247

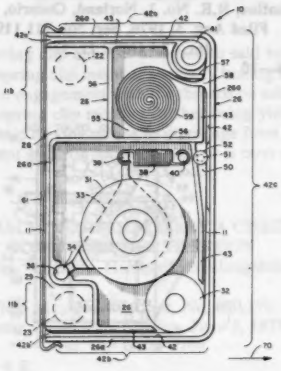
PRINTER RIBBON CARTRIDGE

Richard E. LaSpesa, Chicago, and Alfred Z. Purzycki, Arlington Heights, both of Ill., assignors to Teletype Corporation, Skokie, Ill.

Filed Jan. 26, 1976, Ser. No. 652,363

Int. Cl.² B41J *33/10*

U.S. Cl. 197—168 **10 Claims**



3. An improved cartridge for a printer ribbon of the type in which an endless band of the ribbon is storable prior to use of the ribbon in a printer, the cartridge being mountable in the printer at a location remote from printer-mounted ribbon guide means so that a length of the ribbon spans a platen of the printer between the cartridge and the guide means during both the print strokes and the return strokes of a print head in the printer, wherein the improvement comprises:

A. within the cartridge

1. means responsive to the return strokes of the head for guiding the ribbon along a substantially unconvoluted, U-shaped path interior of the cartridge;
2. means responsive to the ribbon movement for re-inking the ribbon; and
3. means for storing a portion of the ribbon in a convolute prior to the mounting of the cartridge to the printer, the length of ribbon stored in the convolute being sufficient only to span the platen and guide means with no ribbon stored in the convolute after the mounting of the cartridge to the printer; and

B. means

1. for maintaining a segment of the non-convoluted ribbon portion exteriorly of the cartridge and
2. for permitting engagement of the segment with the printer-mounted guide means so that, after such engagement, movement of the cartridge toward the remote location and away from the guide means draws all of the ribbon from the convolute and extends the ribbon out of the cartridge to effect the spanning of the platen by a length thereof.

4,046,248

CONNECTING AND ALIGNMENT MEANS FOR MODULAR CHEMICAL TREATMENT SYSTEM

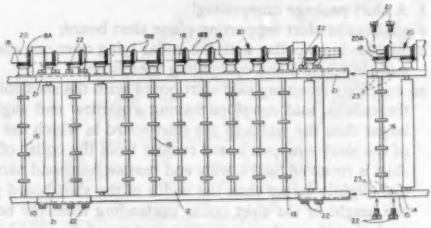
Daniel L. Goffredo, Riverton, N.J., and Conrad Dale Shakley, Spring Mills, Pa., assignors to Chemcut Corporation, State College, Pa.

Continuation of Ser. No. 433,490, Jan. 15, 1974, abandoned, which is a continuation of Ser. No. 303,251, Nov. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 198,622, Nov. 15, 1971, abandoned. This application Oct. 23, 1975, Ser. No. 625,172

The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.

Int. Cl.² B65G *15/60*

U.S. Cl. 198—583 8 Claims



1. An apparatus for use in the treatment of articles as part of an overall etching or other chemical treatment operation, said apparatus including a plurality of serially connected modules, each such module comprising a module body having spaced parallel sidewalls, means for conveying articles through the module body and for defining a longitudinal path of movement of articles through the module body, drive means for said conveying means in driving engagement therewith, and sidewall connecting and alignment means carried by at least one end of each of said spaced parallel sidewalls of said module bodies for connection of said spaced, parallel sidewalls of said module to and for transversely aligning said module with the spaced parallel sidewalls of a longitudinally adjacent module, said connecting and alignment means of at least one of said spaced, parallel sidewalls comprising a connecting means carried by a sidewall of said module and by a mating and abutting sidewall of said longitudinally adjacent module, said connecting means comprising at least one planar surface overlying and held in intimate contact with at least a portion of a longitudinal, vertical planar surface of at least one of said longitudinally adjacent sidewalls, by fastening means penetrating at least one of said parallel sidewalls normally to said longitudinally path, wherein said means for conveying articles includes transversely disposed rotatable shaft members with driven gear means carried at one thereof, along one side of said module, and with said drive means including drive gear means carried on drive rod means that extends along said one side of said module, with the drive gear means being in driving engagement with said driven gear means, and with said drive gear means comprising a plurality of individual gears having gear spacer means disposed therebetween and disposed end-to-end over said drive rod means, with adjacent said gears being longitudinally spaced from each other by said gear means an amount corresponding to the longitudinal spacing of adjacent said driven gear means.

4,046,249

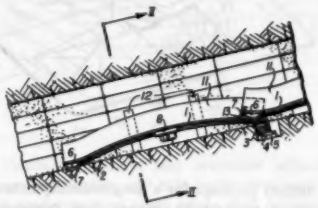
VIBRATION CONVEYOR APPARATUS HAVING CAMBERED TROUGH

Vladimir Isakovich Kreimer, ulitsa Derzhavina, 46, kv. 52; Anatoly Yakovlevich Tishkov, ulitsa Derzhavina, 19, kv. 67; Vitaly Markovich Grigoriev, ulitsa Tankovaya, 69, kv. 7; Ljudmila Ivanovna Gendlina, ulitsa Pisareva, 4, kv. 64, and Leonid Vasilievich Zimonin, ulitsa Borisa Bogatkova, 247, kv. 10, all of Novosibirsk, U.S.S.R.

Continuation of Ser. No. 530,411, Dec. 6, 1974, abandoned. This application May 3, 1976, Ser. No. 682,635

Int. Cl.² B65G *27/34*

U.S. Cl. 198—758 3 Claims



1. A vibration conveyor apparatus for feeding granular materials along inclined channels comprising a flexible resiliant working member in the form of a trough having a loading end portion, a central portion, and an unloading end portion, said central portion being cambered up in the longitudinal direction from the loading end portion towards the unloading end portion, said working member being anchored in at least one point of said inclined channel; and a vibrator connected to said working member.

4,046,250

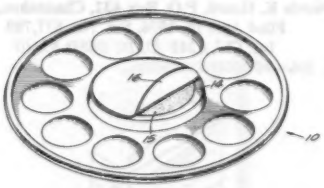
PAINTING PALETTE

Saul Ortega Amezcua, Col. Condesa, Mazatlan 118 Mexico City, 11, Mexico

Filed Aug. 26, 1976, Ser. No. 717,577

Int. Cl.² B44D *3/02*

U.S. Cl. 206—1.7 1 Claim



1. A painting palette, comprising:

a molded plastic member having a plurality of concavities on one surface for receiving painting materials therein and corresponding convexities on the opposite side, said member further including a well located among the concavities with a convex portion thereof on the same side as said first mentioned convexities, with the outermost extensions of said convexities and well convex portion lying in the same plane;

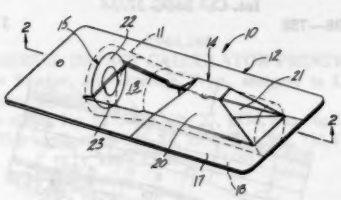
a second surface of said member serving as a supportive base;

a quantity of adhesive on at least a part of said second surface; and

a plurality of sheetlike covers having adhesive on their major surfaces and adhered together to form a stack thereof on the member second surface, whereby a corresponding plurality of adhesive covers are provided for

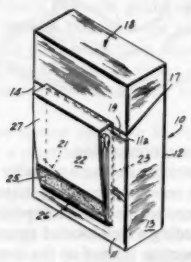
securingly mounting the member to another surface by peeling off the outermost covers one at a time.

4,046,251
DISPLAY PACKAGE
Norman A. Bruml, 24 Donnybrook Road, Montvale, N.J. 07645
Filed Jan. 9, 1976, Ser. No. 648,043
Int. Cl.² B65D *5/50*
U.S. Cl. 206—45.14 **12 Claims**



1. A display package for a longitudinally extended product comprising a rectangular, planar base possessing a central opening therein, said base comprising a pair of substantially rectangular flaps of identical size and shape in overlapping relation to each other, said central opening conforming in outline to the longitudinal configuration of said product, a collar integral with said base which completely surrounds a major portion of the lateral perimeter of said product, said collar comprising opposed harness member respectively integral with corresponding flaps at said opening, said harness members comprising, respectively, paired, opposed trapezoidal supports extending from said flap and in contact therewith along the major portion of the lateral perimeter of said central opening, and rectangular bridge portions linking said trapezoidal supports at the apical ends thereof, and an anchor member integral with said base and located at one or more ends of said opening to secure said product in position within said package.

4,046,252
CIGARETTE PACK
Leonard A. Korby, 12411 S. 76th Ave., Palos Heights, Ill. 60463, and Norris K. Heard, P.O. Box 432, Channahon, Ill. 60410
Filed Apr. 16, 1976, Ser. No. 677,789
Int. Cl.² A24F *15/10*; B65D *85/10*
U.S. Cl. 206—95 **4 Claims**

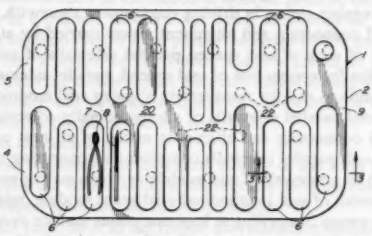


1. In a cigarette pack of the crushproof type having vertical front and back walls joined by side walls into a substantially rigid package, said pack having a top hinged at the back wall and cooperating with the front wall to form a cover for the pack, said cover having a bottom edge spaced from the upper edge of said front wall, the improvement which comprises means defining a straight line slot near the bottom of said front wall extending at an acute angle greater than 0° to the transverse dimension of said front wall and being spaced from said upper edge of said front wall a distance sufficient to accommodate the back of a book of matches when said back is received through said slot and extends behind said front wall, the slot being proportioned such that its lower end is wedged behind the matches in a book of matches when the back of said book is received through said slot.

4,046,253
SHIRT PACKAGE
Mark Weaver, Pottsville, Pa., assignor to Phillips-Van Heusen Corporation, New York, N.Y.
Filed Sept. 26, 1975, Ser. No. 617,099
Int. Cl.² B65D *85/18*
U.S. Cl. 206—278 **6 Claims**

1. A shirt package comprising:
a rectangular shirt supporting plane shirt board;
a shirt having a collar with the collar lying over one end of said shirt board and upstanding therefrom;
an envelope receiving said shirt board with the shirt folded thereabout, said envelope having a narrow end slightly larger than the width of the shirt board in which the end of the shirt wrapped board remote from the collar of the shirt is received, and a wide end remote from said narrow end slightly larger than the width of the shirt board plus the height of the shirt collar upstanding from the board such that the collar supporting portion of the shirt board with the collar upstanding therefrom is received in the envelope with the envelope snugly engaging the shirt wrapped shirt board.

4,046,254
SURGICAL TRAYS
Steven G. Kramer, 355 Serrano Drive, San Francisco, Calif. 94132
Filed Sept. 19, 1973, Ser. No. 398,684
Int. Cl.² B65D *83/10*
U.S. Cl. 206—370 **3 Claims**



1. A surgical instrument tray comprising
a. a base having
  1. an upper face, and
  2. a plurality of spaced, upwardly opening compartments in said upper face for receiving and removably storing individual surgical instruments in respective ones of said compartments,
b. each of said compartments having
  1. a compressible, resilient bottom wall portion, and
  2. a compressible, resilient, upstanding peripheral sidewall portion, and
c. a cover removably mounted on top of said base,
d. said cover having compressible, resilient portions extending across the tops of said compartments in closing relation thereto,
e. said base including a sheet member

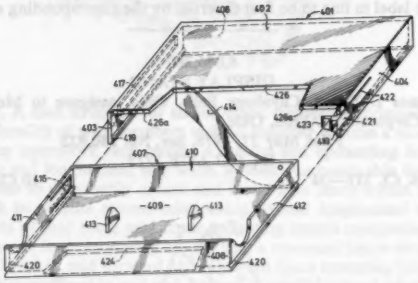
1. having openings therethrough corresponding to said compartments, and
2. disposed between said bottom wall portions and said sidewall portions with said openings defining the lower end portions of respective ones of said compartments.

4,046,255

CONTAINER FOR STANDARD MAGNETIC TAPE CASSETTE

Peter Ackeret, Kusnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Lenzerheide, Switzerland

Filed Nov. 24, 1975, Ser. No. 634,622
Claims priority, application Germany, May 14, 1975, 2521371
Int. Cl.² B65D *85/672*
U.S. Cl. 206—387 **9 Claims**



1. A container for accommodating a standard magnetic tape cassette which has a longitudinal edge adjoining a pair of opposite broad sides each of which has a broad trapezoidal rib-like boss extending along said longitudinal edge, comprising a housing and a carrier slide in the housing, the housing and slide cooperatively defining an interior chamber having a shape similar to the shape of the cassette to confine the cassette in close fitting relation, spring means urging the slide out of the housing, locking means releasably holding the slide in the housing, the housing and slide cooperatively defining cassette-confining top and bottom walls to confront the broad sides of the cassette and also elongate front and back walls and side walls to substantially entirely close the cassette, the front wall being on the slide to form a closure for the open front of the housing, the slide being movable transversely of the front wall out of and into the housing, one of said top and bottom walls having an elongage opening adjacent to and extending along the front wall to receive the trapezoidal boss of the cassette and to accommodate movement of the cassette with the slide relative to the housing, the slide having side portions located beyond the ends of said opening, and guide means on the side portions of the slide and on adjacent portions of the housing to retain and guide the slide in predetermined orientation in the housing during sliding thereof and without interfering with the trapezoidal bosses of the cassette.

4,046,256

CONTAINER CONSTRUCTION

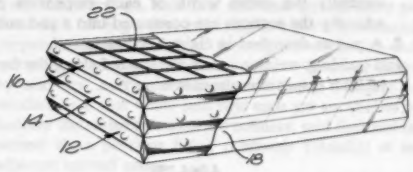
Wayne L. Congleton, Whittier, Calif., assignor to Dolco Packaging Corporation, Burbank, Calif.

Continuation of Ser. No. 434,179, Jan. 17, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,321
The portion of the term of this patent subsequent to Sept. 10, 1991, has been disclaimed.
Int. Cl.² B65D *65/02, 21/00*
U.S. Cl. 206—497 **9 Claims**

1. A tray-like container formed of foamed polystyrene, which can be stacked with unassembled in a generally planar configuration prior to use, comprising:

a bottom wall of generally planar configuration having a bottom surface and a floor surface upon which items to be packaged can be placed;

a plurality of side walls surrounding said bottom wall each being formed so as to lie in a plane parallel to said floor surface when open, each of said side walls being contiguously connected to one edge of said floor surface of said bottom wall by hinge lines therebetween and having an upward extent substantially smaller then the smallest lateral extent of said bottom wall;



abutment means formed on said container adjacent said hinge lines positioning said side walls over said bottom wall at a predetermined acute angle with respect to said floor surface and disposing free outer corner edges of said side walls in a single plane; and

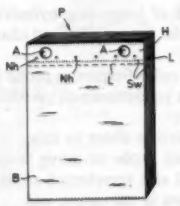
plastic film shrunk-fit across the top of said container enclosing articles therein and forming a planar sheet across said free outer corner edges of said side walls.

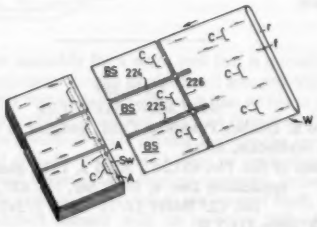
4,046,257

PAD-STACKED BAGS OR SIMILAR PACKAGING, AND APPARATUS AND METHOD FOR FABRICATING THE SAME FROM PLASTIC FILM

Hans Lehmacher, Niederkassel-Mondorf, Germany

Continuation-in-part of Ser. No. 282,193, Aug. 17, 1972, Pat. No. 3,966,524. This application Apr. 10, 1975, Ser. No. 567,073
Claims priority, application Germany, Apr. 13, 1974, 2418233; Sept. 11, 1974, 2443448; Nov. 22, 1974, 2455322; Aug. 17, 1971, 2141045; June 19, 1972, 2229728; July 7, 1972, 2233408; July 26, 1972, 2236523
Int. Cl.² B65D *85/54*
U.S. Cl. 206—544 **12 Claims**





1. A pad of tear-off bags or like packaging of thermoplastic synthetic plastic film and constituted of a stack of bag sections

comprised of said film, said sections each corresponding to a respective bag, each bag section comprising a front wall and a back wall coextensive with the front wall, each section including a tear-off portion and a transverse suspension portion, the suspension portion having hanger holes, the portions of each section being separable along a line of perforations through both said walls, the said sections being connected at the suspension portions thereby to form the pad with a pad suspension portion, with the improvement comprising:

a continuous padding welding seam extending in over substantially the entire width of each suspension portion whereby the sections are connected into a pad unit.

5. A pad as described in claim 1, wherein

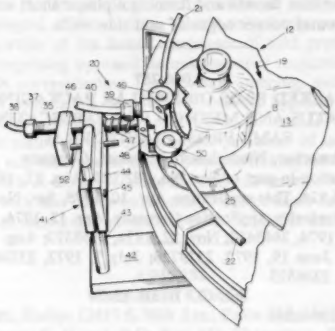
said padding welding seams are located along the free edge of each respective suspension portion.

4,046,258

METHOD AND APPARATUS FOR MEASURING THE ECCENTRICITY OF CONTAINERS

David A. Damm, Swanton, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed July 2, 1976, Ser. No. 701,771
Int. Cl.[2] B07C 5/34
U.S. Cl. 209—111.5 8 Claims



1. A method of inspecting cylindrical articles formed of dielectric material for out-of-round characteristics, comprising the steps of:

supporting a radio frequency probe having a generally planar face in predetermined proximity to the side wall of said article;

rotating the article about its axis;

permitting said probe to move toward or away from said article wall as a preselected arcuate distance of said side wall changes in curvature; and

indicating the output of said probe as a function of the out-of-roundness of said container wall passing said probe face.

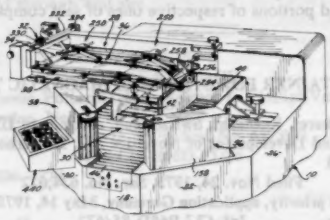
4,046,259

STACKING METHOD

Clifford E. Dunlap, Pasadena, Calif., assignor to W. A. Krueger Co., Scottsdale, Ariz.

Division of Ser. No. 457,367, April 2, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,525
Int. Cl.[2] B65H 33/14; B07C 5/342
U.S. Cl. 209—111.7 R 4 Claims

1. The method of diverting labeled objects moving rapidly in succession in a continuous stream to form a plurality of streams for stacking purposes, comprising employing an electrical shift signal from the sensing of indicia upon predetermined labels to divert said objects selectively to one of said plurality of



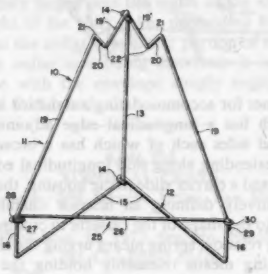
streams, and locating the label a fixed number of labels behind the label in line to be first diverted by the corresponding shift.

4,046,260

DISPLAY STAND

James I. Tallon, Cuyahoga Falls, Ohio, assignor to McNeil Corporation, Akron, Ohio

Filed May 27, 1975, Ser. No. 580,923
Int. Cl.[2] A47F 5/13
U.S. Cl. 211—24 10 Claims



1. An erectable display stand for a generally toroidal article capable of folding into a single plane comprising:

a first side member forming an endless essentially planar configuration;

said first side member having a supporting leg;

a second side member pivotally connected to said supporting leg of said first side member;

a base leg on each of said first and second side members for engaging a resting surface for the stand when erected;

a carriage arm portion of said first and second side members disposed at an angle to said base leg of the respective of said first and second side members for supporting the article to be displayed;

a dogleg offset in said carriage arm portion of each of said side members to positively retain the article to be displayed;

riser posts on each of the said first and second side members connecting said base leg and said carriage arm portion thereof; and

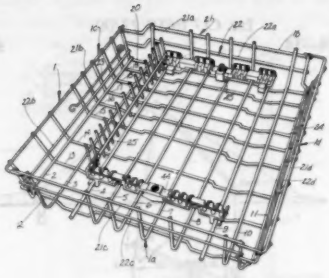
a locking member extending between said first and second side members to effect pivotal placement of said first side member and second side member in spaced angularity, said locking member being a crossbar which effects positive locking by hook and loop means on said crossbar and eye means on said side members at the point where said riser posts merge into said carriage arms whereby said crossbar is substantially coplanar with said carriage arms and is maintained in locking position by the article in engagement therewith.

4,046,261

DISHWASHER RACK

William H. Yake, Connersville, Ind., assignor to Design & Manufacturing Corporation, Connersville, Ind.

Filed Feb. 5, 1976, Ser. No. 655,454
Int. Cl.[2] A47G 19/08
U.S. Cl. 211—41 17 Claims



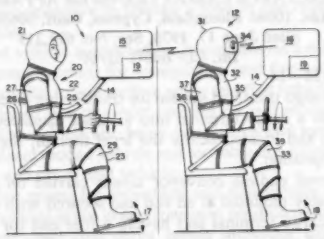
1. A rack structure for an automatic dishwasher comprising a plurality of wire members welded together to form a rectangular openwork rack having a bottom and upstanding front, rear and longitudinal side walls, at least one removable fence, means to detachably mount said removable fence within said rack in parallel spaced relationship to said longitudinal side walls of said rack, said fence mounting means comprising a forward fence mounting bracket and a rearward fence mounting bracket, said forward and rearward fence mounting brackets being affixed to said rack bottom in parallel spaced relationship to each other and to said front and rear walls of said rack, said forward and rearward fence mounting brackets having opposed faces in parallel spaced relationship, said opposed faces having at least one pair of corresponding slots for said at least one removable fence, said at least one removable fence having end portions receivable in said at least one pair of corresponding slots in said forward and rearward fence mounting brackets.

4,046,262

ANTHROPOMORPHIC MASTER/SLAVE MANIPULATOR SYSTEM

Hubert C. Vykukal, Los Altos; Reginald F. King, San Francisco, and Wilbur C. Vallotton, Los Gatos, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 24, 1974, Ser. No. 436,313
Int. Cl.[2] B25J 3/04
U.S. Cl. 214—1 CM 26 Claims



1. A master/slave manipulator system, comprising:

master arm means including first and second master tubular portions, each master tubular portion defining an axis centrally therethrough, said first and said second master portions each having a first end lying in a plane substantially perpendicular to the axis of the respective portions and a second end lying in a plane transverse to the plane defined by said first end, said second ends being adjacent one another such that when said first ends are parallel to one another the respective axes are colinear, said first and said second master portions being relatively rotatable at said adjacent second ends;

master transducing means responsive to the relative rotation between said first and said second tubular portions and operative to provide a driving signal;

slave arm means comprising first and second slave tubular portions, each slave tubular portion defining an axis centrally therethrough, said first and said second slave portions each having a first end lying in a plane substantially perpendicular to the axis of the respective portion and a second end lying in a plane transverse to the plane defined by said first end, said second ends being adjacent one another such that when said first ends are parallel to one another the respective axes are colinear, said first and said second slave portions being relatively rotatable at said adjacent second ends;

slave transducing means responsive to said driving signal and operative to drivingly rotate said first slave tubular portion relative to said second slave tubular portion through an angle that corresponds to the relative rotation between said first and said second master tubular portions; and

communication means linking said master transducing means and said slave transducing means for applying said driving signal to said slave transducing means;

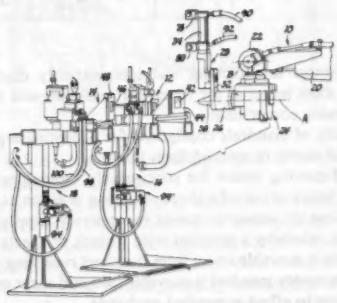
whereby rotation between said first and said second master tubular portions of said master arm means causes a corresponding rotation between said first and said second slave tubular portions of said slave arm means.

4,046,263

TOOL CHANGING APPARATUS FOR A MULTI-AXIS MANIPULATOR

Walter Cwycyshyn, Detroit, and Floyd M. Holroyd, Farmington Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed July 29, 1976, Ser. No. 709,800
Int. Cl.[2] B23K 9/12
U.S. Cl. 214—1 BC 3 Claims



1. A support assembly for a work tool that is movable by a multi-axis manipulator having an elongated arm provided with a wrist assembly that includes a gear unit that serves to pivot a carrier about a horizontal axis and rotate an output shaft about an axis lying in a vertical plane passing through the longitudinal axis of said arm, the work tool having an upstanding plate member secured thereto, said support assembly including a mounting plate member connected to said output shaft, one of said plate members formed with an aperture defined by a plurality of straight sides lying in converging planes, the other of said plate members being formed with a tapered projection having a slot therein, said tapered projection capable of pro-

jecting through said aperture and having a plurality of sides corresponding to the number of sides in said aperture with a portion thereof adapted to mate therewith, an actuator fixedly attached to said mounting plate member, and a wedge member carried by said actuator and movable thereby into said slot formed in a portion of the tapered projection which has passed through the aperture for clamping the upstanding plate of the work tool to the mounting plate member after the tapered projection is projecting through the aperture.

4,046,264

APPARATUS FOR STACKING ARTICLES IN SHEET FORM FOR ELECTRICAL MACHINES

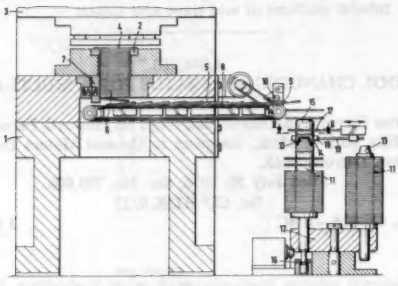
Ewald Bergmann, Rechberghausen; Alfred Bareis, Uhingen; Karl Dangelmaier, Holzheim, and Alfred Kottmann, Donzdorf, all of Germany, assignors to L. Schuler GmbH, Germany

Filed Mar. 8, 1976, Ser. No. 664,693

Claims priority, application Germany, Mar. 6, 1975, 2509709

Int. Cl.[2] B65G *57/16*; B65H *31/32*

U.S. Cl. 214—8 13 Claims



1. Apparatus for stacking and intermittently discharging stacks of sheet material for electrical machines and the like, said apparatus comprising:

a plurality of mandrels configured for accepting a plurality of said sheets in stacked form thereon,

mandrel-moving means for successively moving said mandrels into and out of a sheet receiving position at a delivery zone of conveyor means successively supplying said sheets, whereby a mandrel with a stack of sheets formed therein is movable away from the sheet receiving position and an empty mandrel is movable into said sheet receiving position to effect a mandrel exchange,

a mandrel tip selectively positionable on respective ones of said mandrels at said delivery zone when said mandrels are in said sheet receiving position for accommodating stacking of said sheets on said mandrels over said mandrel tip,

means for engaging and holding said mandrel tip in position at said delivery zone during a mandrel exchange such that an intermediate stack of sheets can be accommodated on said mandrel tip during said mandrel exchange,

and transfer means for accommodating transfer of said intermediate stack to an empty mandrel after said mandrel exchange.

4,046,265

LOADING AND UNLOADING BRIDGE FOR CONTAINERS

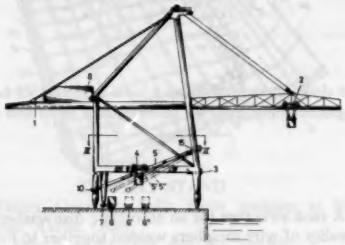
Gerhardus J. Wormmeester, Zwijndrecht, and Joannes C. Rijsenbrij, Boskoop, both of Netherlands, assignors to Europe Container Terminus B.V., Rotterdam, Netherlands

Filed Mar. 2, 1976, Ser. No. 663,137

Claims priority, application Netherlands, Mar. 4, 1975, 7502542

Int. Cl.[2] B63B *27/00*

U.S. Cl. 214—14 5 Claims



1. A portable container crane moveable along the ground comprising a horizontal main girder adapted to extend over a ship, a first trolley moveable along said main girder, a supporting platform mounted in a fixed position on said portable crane beneath said main girder and adapted to support at least one container, an inclined beam mounted in a fixed position on said portable crane extending from a position above said supporting platform to a position above and near the ground, a second trolley moveable along said inclined beam, said first trolley having hoist means for transporting containers between said ship and said supporting platform, said second trolley having hoist means for transporting containers from said supporting platform and a carriage on the ground, the inclination of said inclined beam serving to facilitate rapid transfer of containers from said supporting platform to a carriage on the ground.

4,046,266

RETRACTABLE CARGO TRANSFER APPARATUS

Allan R. Ide, 10066 Bloomfield, Cypress, Calif. 90630

Filed June 17, 1976, Ser. No. 697,219

Int. Cl.[2] B65G *63/00*

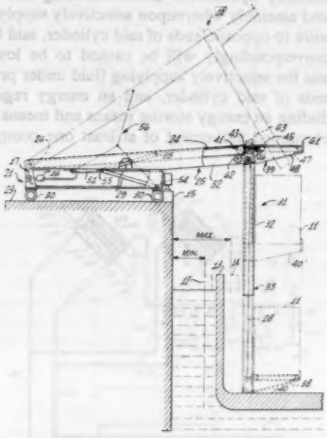
U.S. Cl. 214—14 9 Claims

1. In a cargo transport system for transferring discrete cargo loads from a cargo terminal into a vessel displaced laterally therefrom and located below the level thereof, the improvement comprising:

a powered endless conveyor means carried on a support rotatably mounted at an end and secured with respect to said cargo terminal and having a free end for extension beyond said cargo terminal into vertical alignment with said vessel;

an elevator mechanism depending from the free end of said support and having guideways formed of longitudinally extending telescoping elements and having a cargo receptacle positioned for longitudinal movement along said guideways between a lowered position and an upper posi-

tion in lateral alignment with said powered endless conveyor means at said free end of said support;



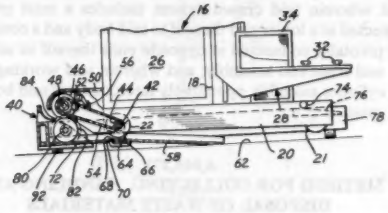
and a winch mechanism for raising and lowering said cargo receptacle longitudinally along said guideways.

4,046,267

WAREHOUSE STORAGE SYSTEM WITH A MULTIVEHICLE ARRANGEMENT HAVING POWER COUPLING MEANS

Paul E. Redelman, South Holland, and Donald H. Busam, Hometown, both of Ill., assignors to Interlake, Inc., Oak Brook, Ill.

Continuation of Ser. No. 336,887, Feb. 28, 1973, abandoned.
This application Oct. 29, 1975, Ser. No. 626,769
Int. Cl.² B65G 1/06
U.S. Cl. 214—16.4 B **9 Claims**



1. A multivehicle arrangement comprising

a first vehicle including load handling means mounted thereon operative to transfer a load to and from said first vehicle,

a second vehicle supported for movement on a substantially horizontal surface for transporting said first vehicle over and parallel to said surface when said first vehicle has been positioned in a transport position on said second vehicle, said first vehicle also being movable on said surface when off of said second vehicle and movable in a given direction onto and off of said vehicle,

first drive means for propelling said first vehicle when said first vehicle is not in said transport position on said second vehicle, said first drive means including first support means for drivingly supporting said first vehicle for movement upon said surface,

second means for propelling said second vehicle, said second means for propelling including second support means for drivingly supporting said second vehicle for movement upon said surface,

first and second ends on said first vehicle, said ends being spaced from each other in said given direction of movement,

first and second elevation means adjacent said first and second ends of said first vehicle and mounted in spaced relation to each other on said first vehicle for elevating said first vehicle above said surface as said first vehicle is being propelled by said first drive means to move onto said second vehicle, third and fourth elevation means spacedly mounted on said second vehicle and operably engageable with a respective one of said first and second elevation means, said third elevation means including means engaged by at least a portion of said first support means as said first vehicle is moved onto said second vehicle and gravitational elevation assist means distinct from said first support means of said first vehicle and adjacent said first end of said first vehicle when said vehicle is in said transport position, said elevation assist means gravitationally assisting the elevation of said second end of the first vehicle by moving said first end of said first vehicle downwardly as said second end is moved upwardly on said fourth elevation means, and

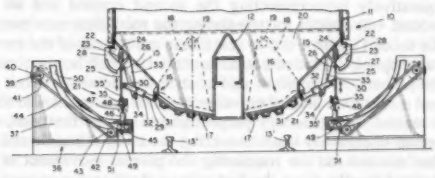
power coupling means, also distinct from said first support means of said first vehicle, coupling said first and second vehicles together automatically in response to the action of said first elevation means and said gravitation assist means and when said first vehicle is in said transport position for transferring power from said first drive means to said second means for propelling said second vehicle.

4,046,268

HOPPER DOOR ACTUATING MECHANISM

Franklin P. Adler, Michigan City, Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed July 19, 1976, Ser. No. 706,868
Int. Cl.² B65G 67/24
U.S. Cl. 214—58 **12 Claims**



1. A railway hopper car having a pair of laterally spaced bottom discharge openings,

doors pivotally connected to said car for swinging movement from a closed position over said openings outwardly to an open position, the improvement of a door actuating and locking mechanism for each door comprising;

an arm including means pivotally connecting said arm to said car for swinging movement from a vertically extending lock position laterally outwardly to an unlock position,

a link pivotally connected to said arm and to said door.

said link having a stop element connected thereto,

a stop bracket supported on said car engaged by said link stop in the lock position to lock said door against outward swinging movement,

said means pivotally connecting said arm to said car providing for limited vertical movement thereof, and

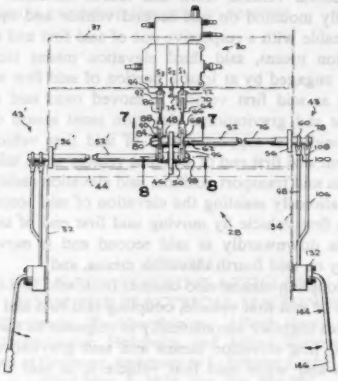
actuating means operable to move said arm verticaly thereby disengaging said link stop from said stop bracket and to swing said arm and door outwardly to an open position.

4,046,269

CONTROL ASSEMBLY FOR REFUSE VEHICLE

Roland W. McKenzie, Culpeper, Va., assignor to City Tank Corporation, Culpeper, Va.

Filed Oct. 14, 1976, Ser. No. 732,436
Int. Cl.² B65F 3/00
U.S. Cl. 214—83.3 **10 Claims**



1. In a refuse collection vehicle including a refuse storage body, a refuse receiving hopper mounted on said refuse storage body and communicating interiorly with said storage body and a fluid actuated mechanism mounted in said refuse receiving hopper for transferring refuse deposited in said hopper into said storage body and compacting the refuse therein, said fluid actuating mechanism including a control valve having a first slidable spool and a second slidable spool, a control mechanism for operating said control valve comprising a first control rod mounted on the refuse hopper for rectilinear motion along its axis, a second control rod mounted on the refuse hopper support structure for rectilinear motion along its axis, means operatively interconnecting the first control rod and the first valve spool for translating the rectilinear movement of the first control rod to rectilinear movement of the first valve spool, means operatively interconnecting the second control rod to the second valve spool for translating the rectilinear movment of the second control rod to rectilinear movement of the second valve spool, a control handle mounted on said hopper, means for pivotal movement of said control handle about a first axis and means for a pivotal movement of said control handle about a second axis generally perpendicular to said first axis, and means operatively interconnecting the control handle and the first control rod for translating the pivotal movement of the control handle about the first axis to rectilinear movement of the first control rod and means operatively interconnecting the control handle and the second control rod for translating the pivotal movement of the control handle about the second axis to rectilinear movement of the second control rod.

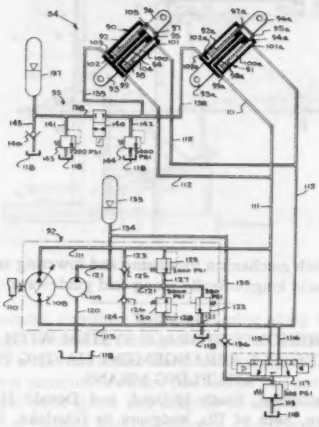
4,046,270

POWER SHOVEL AND CROWD SYSTEM THEREFOR

George B. Baron, and Paul W. Padrutt, both of Marion, Ohio, assignors to Marion Power Shovel Company, Inc., Marion, Ohio

Continuation of Ser. No. 477,022, June 6, 1974, abandoned. This application July 12, 1976, Ser. No. 704,935
Int. Cl.² E02F 3/32
U.S. Cl. 214—138 R **44 Claims**

1. A power shovel comprising a body; a front end assembly mounted on said body including a stiffleg pivotally connected to said body, a dipper handle operatively connected to said stiffleg and a dipper operatively connected to said dipper handle; means mounted on said body and operatively connected to said front end assembly for hoisting said dipper; and means mounted on said body and operatively connected to said front end assembly for crowding said dipper; said crowding means including at least one fluid actuated, working piston and cylinder assembly operatively interconnecting said body of said front end assembly whereupon selectively supplying fluid under pressure to opposite ends of said cylinder, said front end assembly correspondingly will be caused to be lowered or raised, means for selectively supplying fluid under pressure to opposite ends of said cylinder, and an energy regeneration system including an energy storing means and means actuated by a predetermined movement of at least one component of



said front end assembly for charging said energy storing means, said energy storing means providing the charged condition a force applicable to a component of said front end assembly for biasing said component toward a predetermined movement wherein said crowd system includes a mast pivotally connected at a lower end thereof to said body and a connecting link pivotally connected at opposite ends thereof to said mast and said front end assembly; and wherein said working piston and cylinder assembly operatively interconnects said body and said mast.

4,046,271

METHOD FOR COLLECTING, HANDLING AND DISPOSAL OF WASTE MATERIALS

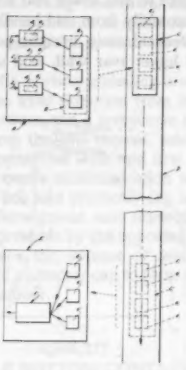
Lawrence Klosk, 3977 Sedgwick Ave., Bronx, N.Y. 10463

Continuation-in-part of Ser. No. 576,869, May 12, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 736,216
Int. Cl.² B65F 3/00
U.S. Cl. 214—152 **3 Claims**

1. A method for collecting and transporting to a disposal site, waste materials deposited in a coverable container within a permanently affixed housing, at a location comprising the steps of:

a. uncovering an empty container and inserting same within the housing by means of an openable side thereon;
b. placing empty containers on an intermediate collection vehicle;
c. bringing said empty containers to said location on said vehicle;
d. removing a filled container from said housing through said openable side, covering same and placing the covered container on said intermediate collection vehicle;
e. replacing said filled container within said housing with an empty uncovered container carried to said housing by said vehicle;
f. transporting said filled container to a transfer site;

g. removing said filled container from said vehicle at said transfer site and emptying each into a final collection vehicle; and



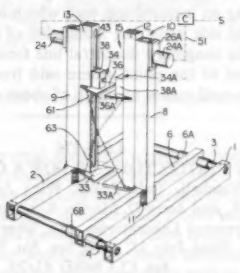
h. transporting said waste materials on said final collection vehicle to a disposal site.

4,046,272

DEVICE FOR UPENDING A CERAMIC MOLD

Donald J. Hayward, 318 S. Grove St., Delton, Mich. 49046

Filed Sept. 15, 1976, Ser. No. 723,237
Int. Cl.² B28B *21/08*
U.S. Cl. 214—312 **6 Claims**



1. In a device for dumping a liquid from a mold, such as for dumping slip from a mold, the combination comprising:

support structure comprising a base and a pair of upstanding support posts positioned rigidly thereon;

lift structure comprising a pair of parallel arranged lifting posts connected in vertically movable, and pivotal, relationship with said support posts and including clamp means for holding a mold on and between said lifting posts;

operator controllable means for lifting said lifting posts with respect to said support posts, and pivot means fixedly mounted on said support posts constantly maintaining said pivotal relationship between said lifting posts and support posts;

whereby so long as the center of gravity of said support posts and the means associated therewith is below the pivotal axis of said pivot means a mold held within said clamp means will remain in liquid holding position but upon lifting of said support structure above said axis such mold will be automatically dumped.

4,046,273

CANOE LOADING APPARATUS

Douglas W. Hughes, R.R. 2, Kenyon, Minn. 55946

Filed Nov. 17, 1975, Ser. No. 632,285
Int. Cl.² B60R *9/00*
U.S. Cl. 214—450 **1 Claim**

1. An apparatus to assist in loading and at least partially supporting a canoe for transport on an automotive type vehicle, including:

a generally upright frame having a pair of horizonal, spaced apart side bars, a top cross bar disposed between and connected to the upper ends of the side bars, and an intermediate cross bar disposed between and connected at an intermediate location on said side bars;

adustable clamp means on the frame to secure the frame to a bumper of an automotive type vehicle, said clamp means including first and second clamp assemblies, one of said clamp assemblies disposed at the lower end of each of said side bars of the frame, each said clamp assembly including upper and lower clips having reverse turn lips adapted to engage upper and lower edges of the bumper of an automotive type vehicle, bolt means assembling the clips to the side bars of the frame, each side bar being provided with a plurality of vertically aligned holes to accommodate the bolt means and permit adjustment of the location of the first and second clips of each clamp assembly;

a hollow tubular member vertically mounted on said frame being connected to said top cross bar and said intermediate cross bar at a location approximately midway between the side bars;

a carrier member for supporting an end section of a canoe, said carrier member having a normally vertical shaft with a lower end in telescopic engagement with said tubular member, said shaft end being axially rotatable in said tubular member and vertically movable therein;

said carrier member having a fork portion for engagement of a canoe end section, said fork portion including a horizontal cross piece secured to the upper end of said shaft to engage and support a canoe gunnel, and a pair of parallel spaced apart arms extending generally upward from either end of said cross piece, said arms being disposed at an inclination relative to said vertical shaft and spaced apart a sufficient distance to intercept and accommodate diverging side walls of an end section of a canoe to snugly engage said side walls with the canoe gunnel resting on said cross piece;

each of said arms and said cross piece of the carrier member being approximately the same length;

said shaft being vertically movable in said hollow tubular member to move said fork portion of the carrier member between a first, lower canoe loading position and a second, elevated canoe transport position;

releasable lock means to lock the carrier member in the elevated transport position, said lock means including a locking pin, a plurality of vertically spaced openings in the tubular member, said locking pin selectively engageable in one of said openings to support the end of said shaft with the carrier member in the elevated position, and removable from said opening to permit movement of the carrier member to the lower position;

a pair of horizontally aligned bicycle tongs for transport of at least one bicycle, one of said tongs being assembled to the lower portion of each of said side bars, said bicycle tongs having aligned, upwardly open loops for receipt of the cross bar of at least one inverted bicycle to locate the bicycle sufficiently below the forked member of the carrier to avoid interference with a canoe loaded thereon; and

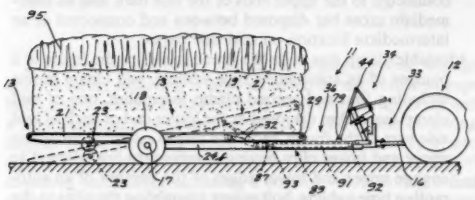
a canoe loading handle usable by a canoeist to load an end section of a canoe in the fork of said carrier member when the carrier member is in the lower position, said handle having a curved body portion generally contoured to substantially conform to the side walls of a canoe, a hook portion at the lower end of the body portion for engagement of the gunnel of a canoe, and a grip member at the upper end of the body portion for gripping and lifting by a canoeist to lift said canoe end section and position it in engagement with the fork portion of the carrier member.

4,046,274

POWER ASSIST HITCH FOR A HAY TRANSPORT

Kenneth E. Libersky, 303 E. 1st St., St. Ansgar, Iowa 50472

Filed Oct. 12, 1976, Ser. No. 731,785
Int. Cl.² B60P *1/16, 1/38*
U.S. Cl. 214—506 **4 Claims**



1. A power assist hitch for use with a tractor and a transport for loading and moving stacks, the transport having a bed pivotable by a tilt cylinder, said hitch comprising:

support means including a main support, the tractor being detachably hitched to said main support;

cylinder means including an external shaft, an internal shaft and a hitch cylinder, said internal shaft being affixed to said main support, said external shaft being attached to the transport, said internal shaft being slidably received within said external shaft, said hitch cylinder being attached at one end to said main support, at the other end to said transport, and disposed within said internal and external shafts; and

control means for selectively actuating said cylinder means and the tilt cylinder, said control means including first means for locking said shafts against relative movement and second means for selectively operating said hitch cylinder and the tilt cylinder, said control means being attached to said main support and having couplings to the tractor, the tilt cylinder and said cylinder means.

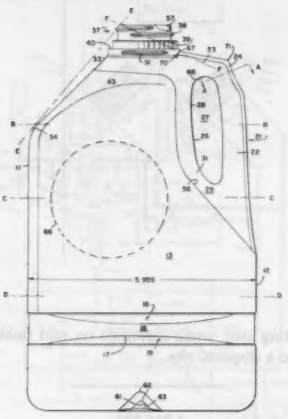
4,046,275

MILK BOTTLES

John J. Virog, Jr., Massapequa Park; Leo Von Hagel, North Massapequa, both of N.Y., and Richard L. Platte, Ann Arbor, Mich., assignors to Honeywell Farms Inc., New York, N.Y.

Filed Oct. 12, 1976, Ser. No. 731,294
Int. Cl.² B65D *23/00*
U.S. Cl. 215—1 C **15 Claims**

1. A blow-molded light-weight thin-walled plastic milk bottle having a volume of substantially three quarts and weighing less than 60 grams, having a substantially rectangular 4 inch by 6 inch cross-section having a 4 inch wide front wall, a 4 inch wide lower rear wall parallel to said front wall and two parallel 6 inch wide side walls at right angles to said front and lower rear walls, said front, lower rear and side walls being substantially vertical and substantially planar, said container having a central squat generally cylindrical upright spout, said spout having an upper mouth opening and having a screw thread therebelow, said mouth opening being adapted to be tightly closed by a correspondingly threaded plastic cap, said bottle having an integral continuously hollow handle centrally positioned, with respect to said lower rear wall, and an upper rear wall spaced horizontally from said handle, said handle having a substantially vertical main upright portion whose base is adjacent to said lower rear wall, said upright portion being



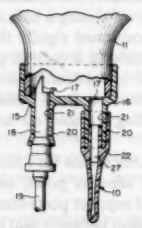
spaced from said upper rear wall sufficiently to provide space for the four fingers of a hand, side-by-side in vertical array, the top of said upright handle portion communicating with a gently sloping upper generally horizontal handle portion which communicates with the bottle just below said spout, said bottle having an inclined top wall which intersects said front wall and said side walls, the inclination of said top wall being such that the imaginary diametral line from the pouring edge of said spout to the point where said front wall meets said inclined top wall makes an angle of about 40° to the vertical.

4,046,276

PORT PROTECTOR CAP FOR A CONTAINER

David A. Winchell, Twin Lakes, Wis.; Joe A. Miller, Lake Zurich, Ill., and Jerry D. Martin, Kenosha, Wis., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed July 14, 1976, Ser. No. 705,211
Int. Cl.² B65D *41/20*
U.S. Cl. 215—250 **8 Claims**



5. A container for injectable fluids comprising:

a housing forming a sealed container for said fluids having a puncturable wall section;

a cylindrical tube segment projecting from said wall section and defining a passageway in communication therewith; and

a removable protector cap including a first sleeve portion dimensioned to be slidably received at one end within said tube segment,

a second sleeve portion dimensioned to be slidably received at one end over said tube segment,

said sleeve portions being concentric and joined at their other ends to form an annular recess for slidably receiving said tube segment in pressure-sealing engagement, and

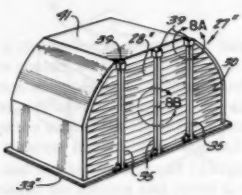
a grippable handle portion including a side wall portion extending in an axial direction from the other ends of said sleeve portions and a transverse end wall portion extending across the end thereof, said handle portion defining in conjunction with said first sleeve portion a chamber in pressure communication with said tubular passageway when said protector cap is inserted on the end of said tube segment, said sidewall being radially-inwardly compressible by the opposing applied external forces to reduce the volume of said chamber upon insertion of said protector cap to form a partial vacuum within said chamber.

4,046,277

FLEXIBLE BOTTOM CONTAINERS

Hadley F. Morrison, Downey, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Sept. 24, 1975, Ser. No. 616,492
Int. Cl.² B65D *87/14*
U.S. Cl. 220—1.5 **3 Claims**



1. An enclosed solid four-sided cargo container comprising:

a top,

a bottom,

a first set of two rigid opposing walls attached to said top and bottom providing support for the top,

a second set of two opposing walls attached to the top and to the bottom comprising distortable pleats which vary in width, said pleats having their greatest width at the center of the wall, the width of the pleats decreasing in both directions toward the side edge of the wall to zero depth, providing a flat surface at the edge of the wall, said pleats orientated parallel to the bottom to impart pliability to said second set of walls in a direction perpendicular to said bottom, whereby said walls permit incremental flexure of the bottom of the container along the line of contact between the second set of walls and the bottom of the container.

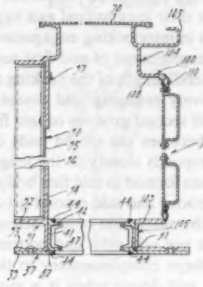
4,046,278

AIR CARGO CONTAINER

George Chieger, Birmingham; Robert B. Schwartz, Harper Woods, and Tara N. Banerjea, Warren, all of Mich., assignors to Fruehauf Corporation, Detroit, Mich.

Continuation of Ser. No. 449,638, March 11, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 615,124
Int. Cl.² B65D *87/00*
U.S. Cl. 220—1.5 **4 Claims**

1. In a cargo container or the like including spaced parallel walls and frame means supporting the same in fixedly spaced relation, a floor assembly extending between said walls and comprising box section planking having spaced top and bottom webs, said frame means including a bottom rail structure extending along the base of at least one of said walls and said rail structure including a U-channeled portion having a vertical bight part, a flange formed as an integral upward extension of the bight part, the wall being secured to said flange, said web flanges of said U-channeled portion extending horizontally outwardly under the bottom of said wall, said structure also



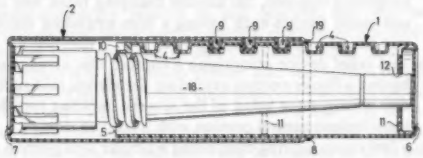
having additional flanges extending horizontally inwardly in the opposite direction from said side web flanges and telescopically fitted between and welded to said top and bottom webs of said planking to support said floor assembly, the floor assembly comprising hollow planks having internal reinforcing ribs extending longitudinally therein perpendicularly to said top and bottom webs and to said wall and recessed to accommodate said additional flanges.

4,046,279

PACKING CONTAINER FOR OBJECTS OF VARIABLE LENGTHS

Peter Rösler, Berlin, Germany, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Continuation-in-part of Ser. No. 568,386, April 16, 1975, abandoned. This application Feb. 27, 1976, Ser. No. 662,264
Claims priority, application Germany, Apr. 19, 1974, 2418846
Int. Cl.² B65D *7/04, 7/30*
U.S. Cl. 220—8 **27 Claims**



1. Container of adjustable length for packing elongated objects of variable lengths, comprising a first elongated cylindrically shaped tubular body and a second elongated cylindrically shaped tubular body, each of said first and second bodies being closed at one end and open at the other end, said first and second bodies arranged to be fitted one into the other in a telescoping fashion and said first and second bodies being rotatable relative to one another about their longitudinal axes, wherein the improvement comprises that the open end of said first body fits within the open end of said second body with its outer surface in juxtaposition to the inner surface of said second body, said first body has a first groove formed inwardly into its outer surface and disposed parallel to its longitudinal axis and extending from its open end toward its closed end, a plurality of second grooves formed inwardly from the outer surface of said first body and extending transversely of and opening from said first groove with said second grooves spaced equidistantly apart along said first groove, said first

groove having a pair of longitudinally extending sides and a bottom extending between said sides, said second groove each having a pair of sides and a bottom extending between said sides of said second groove and at least one detent projecting inwardly from the inner surface of said second body adjacent the open end thereof and said detent shaped and arranged to pass in sliding relationship through said first groove in said first body when said first and second bodies are fitted together in a telescoping fashion and upon relative rotation of said first and second bodies about their longitudinal axis to pass into one of said second grooves in interlocking engagement therewith for effecting a locking engagement of said first and second bodies so that a variable overall length of the packing container can be provided by selectively engaging said detent of said second body into one of said second grooves of said first body so that the overall length between the closed ends of said first and second bodies corresponds closely to the length of the object to be packaged, means formed in said first body at the openings between said first groove and said second grooves for providing a resistance for the movement of said detent into and out of said second grooves and said sides and bottom of said second grooves having a shape complementary to the shape of said detent for gripping said detent when it is moved into one of said second grooves.

4,046,280

DIRECT MOUNTING REVERSE BUCKLING DISC

Franklin A. Hansen, Raytown, Mo., assignor to Continental Disc Corporation, Riverside, Mo.

Filed July 6, 1976, Ser. No. 702,734
Int. Cl.² B65D *25/00*; F16K *17/14*
U.S. Cl. 220—89 A **6 Claims**

1. In combination, an inlet pipe flange and an outlet pipe flange and a safety pressure relief device mounted directly between said flanges:

a. said inlet and outlet flanges respectively having radially projecting opposed, flat annular clamping faces, said inlet and outlet flanges each having a bore extending through said flange to said clamping face,

b. said relief device comprising a rupture disc arrangement having a flange portion extending therefrom, said rupture disc arrangement being of the reverse buckling type having a bulged central portion with a convex side,

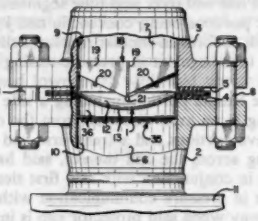
c. a first centering ring comprising a tubular wall portion and a flange portion, and puncturing means mounted at least partially within said first centering ring tubular wall portion, said bulged central portion being directed away from said puncturing means,

d. said first centering ring tubular wall portion being telescopically received into said outlet bore,

e. means cooperating between said first centering ring flange portion and disc arrangement flange portion whereby said last named flange portions are radially coaxially retained with respect to each other in absence of said pipe flanges,

f. a second centering ring comprising a tubular wall portion surrounding said bulged central portion and a flange portion, said second centering ring tubular wall portion forming a mouth and being telescopically received into said inlet bore, means cooperating between said second centering ring flange portion and disc flange portion whereby said last named flange portions are radially coaxially retained with respect to each other in absence of said pipe flanges, and

g. means clamping said first and second centering ring flange



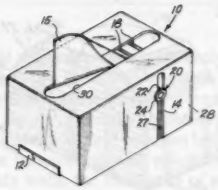
portions and rupture disc flange portion in sandwiched arrangement between said pipe flanges.

4,046,281

METHOD AND APPARATUS FOR DISPENSING FLEXIBLE MATERIALS

Henry C. Voegeli, 918 Gibbs Rd., Venice, Fla. 33595

Filed Apr. 19, 1976, Ser No. 677,866
Int. Cl.² B65G *59/02*
U.S. Cl. 221—23 **8 Claims**



1. Apparatus for dispensing individual sheets of flexible materials from an interleaved stack of folded sheets whereby the ultimate sheet in said stack is presented in a partially upstanding position to facilitate grasping and dispensing thereof, said apparatus comprising:

a. base means for supporting an interleaved stack of folded sheets;

b. gravitational frictional engaging means for contacting the exposed face of the ultimate sheet in said stack intermediately along the length thereof permitting withdrawal of said ultimate sheet and for constantly frictionally engaging the exposed face of the penultimate sheet in said stack and restraining same once the exposed face of said ultimate sheet has passed whereby said penultimate sheet is then presented in partially upstanding position beyond contact with said frictional engaging means defining a static dispensing plane intersected by said engaging means.

4,046,282

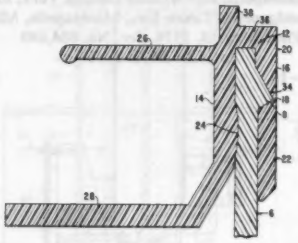
MOLDED PLASTIC COVERS FOR CONTAINERS

Heinz Ruch, Basel, Switzerland, assignor to Albert Obrist & Co., Basel, Switzerland

Division of Ser. No. 591,102, June 27, 1975, Pat. No. 4,005,101, which is a division of Ser. No. 349,256, April 9, 1973, Pat. No. 3,915,613. This application Nov. 2, 1976, Ser. No. 737,799
Int. Cl.² B65D *41/32*
U.S. Cl. 220—270 **10 Claims**

1. In a relatively flexible one-piece molded plastic cover for an open mouthed container, wherein said container has a cir-

cumferential extending projection on its outer wall in the region of the edge of said container, wherein said cover has an inverted U-shaped rim in the form of a pair of upstanding circumferential sidewalls, and wherein the outer sidewall of said cover has a circumferential weakening line which subdivides the cover into a first cover member reusable as a cover and a second cover member being a tear-off end portion, the improvement comprising means for providing firm clamping and contact pressure between the upper edge of said container and the sidewalls of said cover by having the inner sidewall of



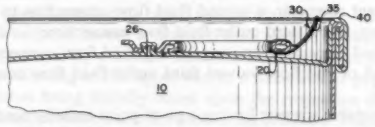
said cover with a circumferential extending bulged portion tc maintain pressure contact with the inner wall of said container, said bulged portion being disposed approximately on the level of said projection, and having the outer sidewall of said cover shaped to engage the edge of said container firmly above said projection, and a recess in said outer sidewall of said cover shaped to form said weakening line and to engage the projection on said container for locking said cover to said container, the outer surface of said outer sidewall being substantially straight line in cross-section.

4,046,283

FINGERNAILESS TAB FOR RING-PULL CAN OPENERS

Frank J. Lockwood, 7011 W. Archer Ave., Chicago, Ill. 60638

Filed May 30, 1975, Ser. No. 582,162
Int. Cl.² B65D *41/32*
U.S. Cl. 220—270 **5 Claims**



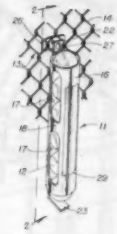
1. A ring-pull opener for a can containing beverages and the like comprising a cover having a tear portion and a ring attached to said tear portion, a flexible upstanding tab attached to said ring at a point on said ring diametrically opposed to said tear portion and at an acute angle to said cover to permit said tab to be easily grasped to elevate said ring, whereby said ring may be grasped to open said can, said tab having an adhesive on the one side thereof, said adhesive permitting said ring and tear portion upon removal from said can to be adhesively secured to any desired portion of said can to maintain the ring tear portion and can together for ease of disposal.

4,046,284

TENNIS BALL CONTAINER INDICATING PLAYERS TURNS

Frank A. Samuelsson, 738 Ruby St., Redwood City, Calif. 94061

Continuation of Ser. No. 513,098, Oct. 8, 1974, abandoned. This application Jan. 9, 1976, Ser. No. 647,896
Int. Cl.² B65H *1/00*
U.S. Cl. 221—45 **2 Claims**



1. A tennis ball container for indicating players' turns wherein a player deposits a tennis ball having distinguishing characteristics in the top of the container and later withdraws the ball from the bottom of the container after other players have withdrawn previously deposited balls, whereby the order of balls in the container from bottom to top indicates players' turns, said container comprising a cylindrical member of a length at least as great as the diameter of two balls having an inside diameter slightly greater than the normal diameter of the balls to be contained, the top of said cylindrical member being open and unobstructed for deposit of balls, the bottom of said cylindrical member being open, and attachment means rigidly fixed to said cylindrical member to mount said cylindrical member in upright position, at least a portion of said cylindrical member being apertured so that view of all the balls in the interior of said cylindrical member is unobstructed from approximately 300° angle about the axis of said cylindrical member so that players may observe all the balls within said container, said attachment means being unitary and comprising a rigid vertical elongated metal bracket and a stop comprising an outwardly bent rigid lower end of said bracket bent downwardly-outwardly relative to said bracket, said stop being fixedly secured below said cylindrical member with a fixed gap between the lower end of said cylindrical member and said stop which is at no position greater than said normal diameter, the width of said stop being approximately one-third the diameter of said cylindrical member so that a ball may be withdrawn from said container by pulling said ball from the front or from either side, the ball distorting in shape so as to be pulled through said gap, said attachment means further comprising a clamping plate adapted to be positioned on the side of a wire fence opposite said bracket and bolts connecting said bracket and plate and passing through said fence to secure said bracket and clamping plate together to mount said container on said fence.

4,046,285

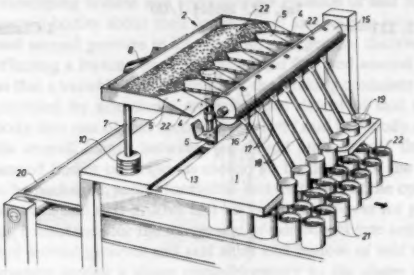
METHOD AND APPARATUS FOR PRODUCING SINGLE FLOWS OF GRAINS

Karl Leonart Wendt, Box 60, S-910 26, Stocksjo, Sweden

Filed May 12, 1976, Ser. No. 685,607
Claims priority, application Sweden, June 5, 1975, 7506449
Int. Cl.² B65G *47/14*
U.S. Cl. 221—157 **7 Claims**

1. A method of diverting from a supply of grains a plurality of parallel intermittent single flows of grains, comprising the steps of: moving the grains of the supply in a definite direction

on a plane support by utilizing vibration feed, dividing the resulting wide grain flow into a plurality of parallel single-row flows by guiding said wide grain flow into a corresponding number of grain paths connected to said plane, each grain path being designed so as to be able to convey only a single row of grains, adjusting the vibration feed to cause the grains on said paths to turn by mutual action to a uniform orientation, transferring the grains from said grain paths one by one to means



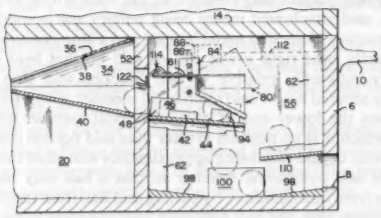
rotating about an axle and discharging the grains at predetermined time intervals from said rotating means in accurately determined positions, wherein said rotating means is a rotary cylinder, and further including the steps of: feeding per time unit more grains into said paths than are removed by said rotary cylinder for forming in each path a string of grains abutting each other and the envelope surface of the cylinder, permitting excess grains to be pressed out of said paths and collected and later on returned to the grain supply.

4,046,286

TAMPER-PROOF BALL DISPENSING MECHANISM

Eugene Lee Peppard, 3537-46th Northeast, Seattle, Wash. 98105

Filed June 9, 1976, Ser. No. 694,312
Int. Cl.[2] B65H *33/14*
U.S. Cl. 221—251 11 Claims



1. A tamper proof dispensing mechanism for use in conjunction with game tables or the like comprising:

a first storage area inaccessible to the player to receive game elements ejected from the playing surface and store them prior to dispensing;

a combination measuring and dispensing apparatus adjacent the first storage area and inaccessible to the player, said measuring and dispensing apparatus interconnected with the first storage area and comprising a sloping floor member for supporting the playing pieces prior to dispensing and an elongated gate member including a downwardly extending side element running substantially the entire length of the gate member, said side element serving to both contain the game elements prior to dispensing, and to restrict the elements to a simple line along the gate member said gate member pivotable to permit the simultaneous dispensing of the playing pieces

means preventing movement of playing pieces from the first storage area during the dispensing process;

means exterior of the table to actuate the measuring and dispensing apparatus, and

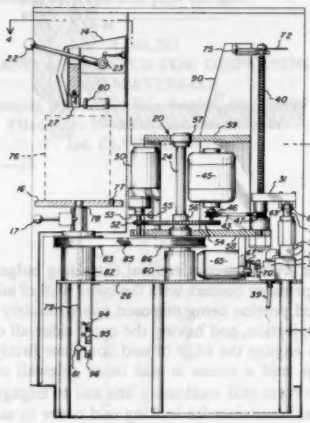
a second storage area accessible to the player for holding the playing pieces prior to use.

4,046,287

AUTOMATIC METERING AND DISPENSING SYSTEM

Joop Frans Hoekstra, Medfield, Mass.; Donovan Harold Lumby, Minneapolis, and William Duncan Vork, Edina, both of Minn., assignors to Graco Inc., Minneapolis, Minn.

Filed May 10, 1976, Ser. No. 684,680
Int. Cl.[2] B67D *5/10*
U.S. Cl. 222—16 41 Claims



1. A fluid component selection and metering apparatus for selecting prestored fluid component formulations and metering fluid components proportioned according to the selected formulations into a receptacle, comprising:

a. means for retaining a plurality of fluid formulations;

b. a plurality of fluid component reservoirs for storing fluid components;

c. a plurality of positive displacement fluid metering pumps arranged along a circular arcuate path, each pump having a vertically movable plunger;

d. a fluid flow valve attached to each of said pumps, said valve having a first fluid flow connection to a fluid component reservoir, a second fluid flow connection to said pump, and a third outlet fluid flow connection;

e. a fluid dispensing housing having fluid flow connections to all of said flow valves' third outlet fluid flow connection;

f. a rotatable scanner having a pivot point radially centered relative to said circular arcuate path and having thereon a metering pump drive system and a fluid flow valve drive system, and also having means for positively coupling said drive systems respectively to a fluid metering pump and a fluid flow valve; and

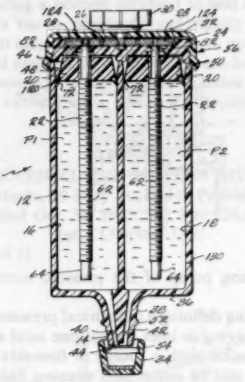
g. means for selecting a fluid formulation and controlling said scanner for selective rotatable connection to positive displacement fluid metering pumps and fluid flow valves corresponding to said selected fluid formulation, and for activating said metering pump drive system and said fluid flow valve drive system to controllably dispense said fluid components through said fluid dispensing housing.

4,046,288

PLURAL CHAMBER DISPENSER

Carl Bergman, 2316 NE. 28th Court, Lighthouse Point, Fla. 33064

Filed Feb. 6, 1976, Ser. No. 656,087
Int. Cl.[2] B67D 5/42
U.S. Cl. 222—135 15 Claims



9. A dispenser, comprising:

a body having side wall means defining at least one generally cylindrical chamber for containing a fluid product, each chamber having one end wall with a dispenser spout extending therethrough;

an operator assembly fitted on the opposite end of the body,

the operator assembly uniting: a cap; a rotatable operator outside the cap, a helically threaded rod for each chamber, an internally threaded piston mounted on each rod for longitudinal travel therealong upon rotation of the rod; a plate; means received on said plate and rotatively connecting the operator through the cap, with each rod, so that as the operator is rotated, each piston is advanced;

and means on the cap and body securing the operator assembly on the body with each depending in a respective said chamber:

the operator assembly being a prefabricated unit, wherein:

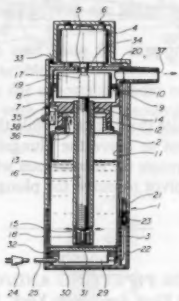
each said rod having a threaded main section flanked at the upper end by a smaller diameter unthreaded section and terminating at the upper end in a non-circular peg; each piston being initially borne upon the respective said unthreaded section and the plate being provided with at least one opening, into which each respective said peg upwardly protrudes; a recess formed in the upper side of the plate; the rotatively connecting means being deposited in said recess; the rotatively connecting means having a non-circular opening formed centrally therethrough; the operator including a handwheel having a shaft extending coaxially therefrom, said shaft having a portion of non-circular section, said shaft portion being inserted in the non-circular opening of said rotatively connecting means to key the operator to that means; said peg of said rod being received in the non-circular opening to key the rods to the rotatively connecting means.

4,046,289

LATHERING DEVICE

Akihiko Teranishi, Nagoya, Japan, assignor to Kabushiki Kaisha Teranishi Denki Seisaku-Sho, Japan

Filed May 24, 1976, Ser. No. 688,953
Claims priority, application Japan, May 30, 1975, 50-64150; Dec. 27, 1975, 50-156999; Oct. 24, 1975, 50-144248[U]; Nov. 7, 1975, 50-150738[U]; Dec. 29, 1975, 51-178759[U]; Mar. 11, 1976, 51-28077[U]; Nov. 7, 1975, 50-150739
Int. Cl.[2] B67D 5/62
U.S. Cl. 222—146 HE 16 Claims



1. A lathering device comprising

an outer casing;

a first chamber disposed within said outer casing, for storage of liquid soap;

one or more second chambers disposed within said outer casing and above said first chamber;

heater means for heating said liquid soap;

an elongated hollow means having two ends, one end being closed with an opening near the end and the other end being open, said hollow means disposed to connect said first chamber and said second chamber with said one end disposed with the closed end toward the bottom of said first chamber thereby providing a path for passage of said liquid soap through said opening at the closed end, through said hollow means and into said second chamber;

outlet means located at said second chamber;

motor means having a shaft, disposed above said second chamber;

agitating means disposed within said second chamber;

screw means disposed within said hollow means and extending through a substantial portion thereof;

joining means connecting said motor shaft, to said agitating means and to said screw means; and

air passage means for enabling air to controlledly travel into said first and second chambers from outside of said outer casing, whereby operation of said motor turns concurrently both said agitating means and said screw means to cause said screw means to lift up said liquid soap through said hollow means from said first chamber into said second chamber to cause said agitating means to effect foaming of said liquid soap and ejection of said foamed liquid soap through said outlet means.

4,046,290

DISPENSER SYRINGE APPARATUS HAVING ALTERNATELY DRIVEN CAMS

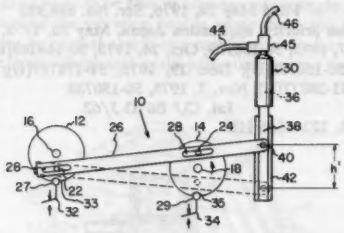
Nevitt M. Louder, Verona, Pa., assignor to Fisher Scientific Company, Pittsburgh, Pa.

Filed July 6, 1976, Ser. No. 702,408
Int. Cl.[2] F16H 28/08
U.S. Cl. 222—267 18 Claims

1. A dispensing apparatus comprising:

A. a syringe having a plunger therein and fill means and discharge means associated therewith;

B. first and second cams positioned in spaced relationship;
C. a connecting rod joining the two cams and the plunger; and



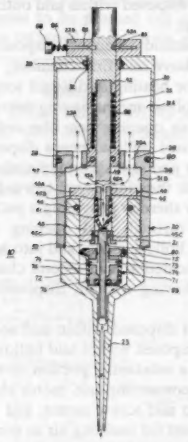
D. means to rotate the first cam while the second cam acts as the fixed pivot to move the plunger through a first distance and to rotate the second cam while the first cam acts as the fixed pivot to move the plunger through a second distance.

4,046,291

DEVICE FOR PIPETTING AND/OR DILUTING

George Goda, 390 First Ave., New York, N.Y. 10010

Filed Jan. 7, 1976, Ser. No. 647,106
Int. Cl.[2] G01F *11/06*
U.S. Cl. 222—309 19 Claims



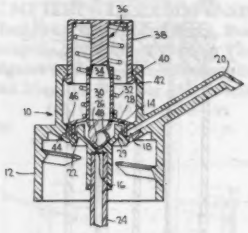
1. A pipetting/diluting device, comprising:
a tubular body having front and rear ends, said body having a central bore which narrows at the front end thereof to form a tip;
a plunger slideable in said bore and extending from the rear thereof for manual activation, said plunger having a front portion which conforms circumferentially to at least a portion of the inner surface of said body, the bore space in said body forward of the plunger defining a front chamber,
an enclosure defining a back chamber, said enclosure being mounted on said body rearwardly thereof and surrounding said plunger;
said plunger having a communicating passage between said back and front chambers;
first one-way valve means restricting flow in said communicating passage to occur only from said back chamber toward said front chamber; and
second one-way valve means restricting flow as between said front chamber and said tip to occur only from said front chamber toward said tip.

4,046,292

MANUAL CONTAINER MOUNTED PUMP

Douglas F. Corsette, 6559 Firebrand St., Los Angeles, Calif. 90045

Filed Aug. 31, 1976, Ser. No. 719,234
Int. Cl.[2] B05B *11/00*
U.S. Cl. 222—383 11 Claims



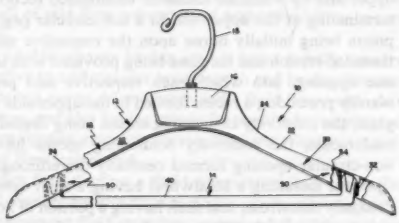
1. A dispensing pump of the pressure accumulating type comprising;
a pump housing defining a cylindrical pressure accumulation chamber having in inlet port at one axial end thereof for communication with a source of flowable product to be dispensed, and an outlet port opening radially from said chamber;
an inlet check valve controlling said inlet port;
a centrally apertured outlet valve disposed for axial movement in said chamber from a closed position adjacent said one axial end of the chamber in which it blocks communication between said inlet and outlet ports to an open position remote from said one axial end in which it establishes communication between said inlet and outlet ports;
resilient means normally urging said outlet valve toward its closed position;
a pump cylinder carried by said outlet valve coaxially to said pressure accumulation chamber and in constant communication with said chamber through the central aperture of said valve;
a pump piston reciprocable in said cylinder independently of the movement of said outlet valve;
and means for manually reciprocating said piston.

4,046,293

DETACHABLE BAR FOR GARMENT HANGER

Judd F. Garrison, Grand Rapids, Mich., assignor to John Thomas Batts, Inc., Zeeland, Mich.

Filed July 28, 1976, Ser. No. 709,460
Int. Cl.[2] A47J *51/097*
U.S. Cl. 223—88 13 Claims



1. In combination, a garment hanger and an improved detachable pants bar, said garment hanger including a central head portion and outwardly extending arms, the arms includ-

ing means defining a socket adjacent the end thereof for receipt of the pants bar, and wherein said pants bar comprises:

an elongated support bar; and

upstanding locking means at each end of said support bar and extending generally perpendicular to said support bar for positively and detachably locking said pants bar to said hanger at said sockets, each of said locking means including

an upstanding resilient detent finger positioned adjacent each end of said pants bar, said hanger arms further defining a detent aperture at said sockets, said resilient detent finger having a portion received in said aperture so that said pants bar is positively and rigidly locked to said hanger but may be detached therefrom upon manual shifting of said resilient detent finger, and wherein said socket defining means of said arms each includes a pair of spaced, generally vertical walls, said socket opening downwardly.

4,046,294

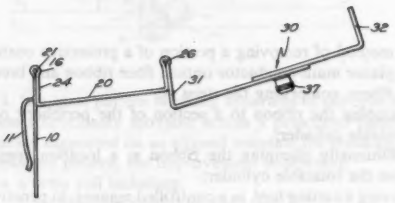
ELECTRICAL INSTRUMENT HOLDER

Raymond O. Morin, 20 Eddy St., North Providence, R.I. 02911

Filed Oct. 28, 1975, Ser. No. 626,483

Int. Cl.² A45F 5/00

U.S. Cl. 224—5 H **3 Claims**



1. A body mounted electrical instrument holder comprising a support plate having a flat surface with edges, means for supporting said plate from a person's body so that one edge defines an upper edge, an arm having legs at its ends extending at generally right angles thereto, one of the legs hinged at its free end to the upper edge of said support plate to rest against said support plate when the arm and legs are relatively swung in an arc of approximately 270° about the support plate, an electrical meter clamp having a generally flat inner body portion to receive a meter, said body portion having a leg at one end thereof extending at generally right angles to the flat body portion and hinged at its free end to the free end of the other of the legs of said arm to rest against said other leg and support the meter clamp in generally horizontal extension of said arm, said support plate after removal from the supporting position on the body portion swinging in an arc of approximately 270° to collapse the holder whereby the support plate may be swung over the arm and the meter clamp swung over the plate and arm from the other end of the arm into folded position.

4,046,295

CARRYING DEVICE FOR PORTABLE ARTICLE

Jay H. Eichler, Boca Raton, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 31, 1975, Ser. No. 563,946

Int. Cl.² A45C 11/24

U.S. Cl. 224—5 H **8 Claims**

1. A carrying device for an elongated portable article of a predetermined height which has a ledge thereon intermediate its ends and a surface at a fixed position with respect to the ledge, such carrying device including in combination:

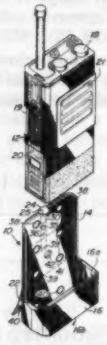
a supporting plate having a surface adapted to be engaged by the article, said plate further having a slot therein and a recess adjacent said slot,

means secured to said plate forming a loop having open-ended top and bottom and a lateral dimension less than the height of the article, said loop being adapted to receive the article therein whereby the article extends above and below the lateral dimension of the loop, said loop having a stop surface in the interior thereof intermediate the top and bottom to be engaged by the ledge on the article,

latch means including an arm extending into said slot and recess of said plate and further including means fastening said latch arm to said plate at said recess, said latch means being secured to a top portion of said plate and having a portion operating to overlie the fixed position surface of the article when the article is received in said loop to hold the article in position with the ledge thereon against said stop surface, and

means secured to said plate for supporting the carrying device and the article.

5. A carry holder for a portable radio of a predetermined height having a top with controls extending therefrom, a side with a switch actuator and a ledge below the actuator which is



at a given spacing from the top, and a front with a grille in the top portion thereof, said carry holder including in combination:

a back plate and means extending forwardly thereof to form a loop having open-ended top and bottom and a lateral dimension less than the height of the radio, said lateral dimension of the loop being adapted for receiving the portable radio, said loop further having a more narrow lateral measurement at at least one point, said top of said more narrow lateral dimension comprising a stop surface to be engaged by the ledge on the side of the radio to support said radio, with the radio extending above and below the lateral dimension of said loop,

latch means secured to a top portion of said back plate and having a portion for extending over the top of a radio positioned in said loop, and

means secured to said back plate for supporting the carry holder.

4,046,296

BELT HOLSTER PURSE ASSEMBLY

Anna McGhee, 2541 Oaklen Way, Forestville, Md. 20028

Filed Aug. 3, 1976, Ser. No. 711,160

Int. Cl.² A45C 1/04

U.S. Cl. 224—26 D **7 Claims**

1. A belt holster purse comprising in combination:

an elongated belt element having end portions adapted to be releasably connected;

at least one longitudinally extending reinforced slot formed in said belt element;

and at least one purse member slideably mounted in selected ones of said slots, each said purse member including top, bottom, front and rear walls, a stud member being carried by said rear wall adapted to project through said slot and slidable in said slot a first fastening element being provided on the outer free end of said stud member, the top

wall of said purse member having a free end extending downwardly in overlying relation to at least the upper portion of said rear wall and being provided with a second fastening element cooperable with said first fastening

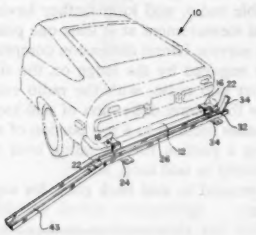
element for simultaneously closing said purse member and releasably locking same to said belt element, said free end concealing said slot when said fastening elements are engaged.

4,046,297

VEHICLE BUMPER MOUNTED CARRIER FOR CYCLES

Herbert Bland, 133 N. Arbor Trail, Apt. 603, Park Forest, Ill. 60466

Filed Jan. 7, 1976, Ser. No. 647,135
Int. Cl.² B60R 9/10
U.S. Cl. 224—42.03 B **2 Claims**



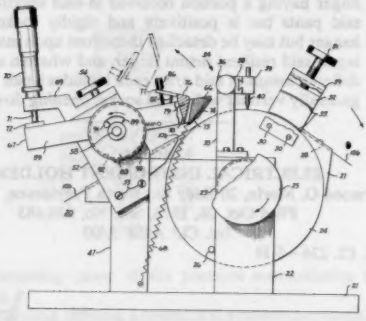
1. A cycle carrier, comprising a pair of hinge brackets, mounted in horizontally aligned and spaced relation along the upper marginal edge of a vehicle bumper, each bracket having hingedly connected upper and lower plates, the free end of each of the upper plates being turned into a hook adapted to engage the upper edge of a vehicle bumper and providing the sole attachment for the carrier to the bumper, the lower plate of each bracket being turned into an angularly disposed flange, means for adjusting the pivotal connection of said plates so that said angularly disposed flanges are in substantially the same horizontal plane, a channel member carried on said flanges for supporting a cycle thereon, said channel members being adjustably mounted longitudinally on said flanges, said pivotal adjusting means including a pad screw threadedly mounted in said depending plate, to prevent contact of said plate with said bumper.

4,046,298

METHODS AND APPARATUS FOR STRIPPING OPTICAL FIBER RIBBONS

Charles Martin Schroeder, Jr., Hamilton Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 645,145
Int. Cl.² B26F 3/00
U.S. Cl. 225—2 **4 Claims**



1. A method of removing a portion of a protective coating from a planar multi-conductor optical fiber ribbon and breaking the fibers, comprising the steps of:

a. clamping the ribbon to a section of the periphery of a rotatable cylinder;

b. additionally clamping the ribbon at a location remote from the rotatable cylinder;

c. moving a cutting tool, in a controlled manner, to penetrate the coating to a predetermined depth;

d. rotating the cylinder to simultaneously remove the portion of the protective coating with the cutting tool while longitudinally stressing and exposing the optical fibers and bending the exposed fibers to a predetermined radius of curvature conforming to the periphery of the cylinder; and

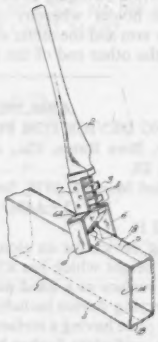
e. scoring the exposed optical fibers to cause them to break.

4,046,299

GLASS CUTTING METHOD

John G. Swartzfager, 9381 SW. Taylor, Portland, Oreg. 97225

Filed June 7, 1976, Ser. No. 693,645
Int. Cl.² B26F 3/08
U.S. Cl. 225—3 **2 Claims**



1. The method of lengthwise severing a glass tube of rectangular section, said method consisting of the steps of,

lengthwise scoring the minor sides of the tubular member,

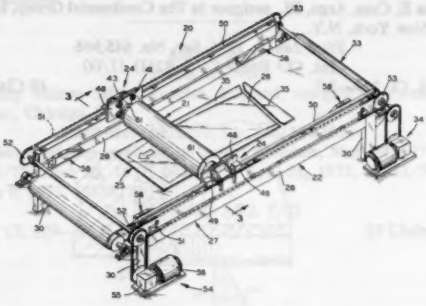
applying inward pressure to a major side of the rectangular member to impart both tension and compression forces to glass zones located adjacent the lengthwise scorings to separate the glass tube into boat shaped pieces.

4,046,300

SCORED GLASS BRACKET BREAKING APPARATUS

Robert H. Welker, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed June 1, 1976, Ser. No. 691,903
Int. Cl.[2] C03B *33/04*
U.S. Cl. 225—103 **8 Claims**



1. In a glass pattern breaking apparatus of the type having a press roll rollably movable across a prescored pattern glass bracket supported on an aligned template for breaking out the prescored pattern, the improvement comprising

a. a press roll including:

1. an elongate rigid core shaft, and
2. a resilient pliable body covering said core shaft, and

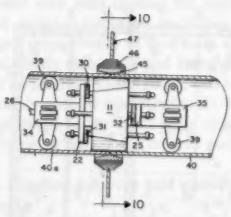
b. means for floating said press roll in a plane substantially perpendicular to said template so that its weight freely bears against the glass bracket supported on said template to cleanly break out the prescored pattern.

4,046,301

PROCESS FOR EXPLOSIVELY JOINING TWO PIPE SECTIONS

Robert H. Wittman, Littleton, and William G. Howell, Lakewood, both of Colo., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 489,523, July 18, 1974, Pat. No. 3,987,952, which is a continuation-in-part of Ser. No. 252,641, May 12, 1972, abandoned. This application Aug. 2, 1976, Ser. No. 711,015
Int. Cl.[2] B23K *21/00*
U.S. Cl. 228—108 **3 Claims**



1. A process for explosively joining two pipe sections arranged in end-to-end abutting relationship comprising:

positioning around the joint of said abutting pipe section a metal collar having a central portion and end portions which taper radially outwardly from said center portion to their respective outer ends, the outer surface of said collar being substantially cylindrical such that said center portion is the thickest portion of said collar;

placing around said collar a ring of high explosive which is shaped to have a greater radial thickness adjacent the central portion than adjacent the end portions of said collar, said high explosive having a detonation velocity of between about 15,000 and 30,000 feet per second; and

simultaneously detonating said explosive at a plurality of locations which are radially aligned with the joint of said abutting pipe sections and which are circumferentially spaced about said ring.

4,046,302

METHODS OF MANUFACTURING BODIES OF CONGLOMERATED PARTICLES

Hermann J. Schladitz, 74 Plaentschweg, Munich, Germany

Filed May 18, 1976, Ser. No. 687,512
Claims priority, application Germany, May 26, 1975, 2523249
Int. Cl.[2] B23P *3/22*; B22F *1/02*
U.S. Cl. 228—121 **15 Claims**

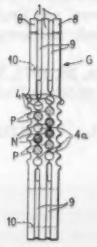
1. A method of manufacturing a body of conglomerated particles, comprising coating the particles with a network of polycrystalline metal whiskers with a diameter in the range 0.05 to 1 μm, heating the coated particles to a temperature at which the whiskers sinter together at their areas of contact, mixing the coated particles with filaments, and metallically bonding the filaments and the coated particles at their areas of contact.

4,046,303

METHOD OF MAKING NEEDLE GUIDE DEVICES FOR MOSAIC PRINTERS

Richard Reier, Taufkirchen, and Peter Küelzer, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 25, 1975, Ser. No. 598,926
Claims priority, application Germany, July 31, 1974, 2436970
Int. Cl.[2] B41J *3/04*
U.S. Cl. 228—173 **14 Claims**



1. A method of making a guide device for printer needles used in printer heads of mosaic printers, such guide device being adapted to guide the needles adjacent to the printing area of a printing head, the method comprising:

providing members of rolled or drawn material;

stamping or embossing guide grooves in said members;

forming openings in said members across said grooves to interrupt the grooves so that the grooves provide spaced aligned sections;

assembling said members with said guide grooves in complementary cooperaing confronting relation and thereby forming needle guideways; and

securing the members in assembly to provide said device.

4,046,304

PROCESS FOR PRODUCING METAL COMPOSITE MATERIAL

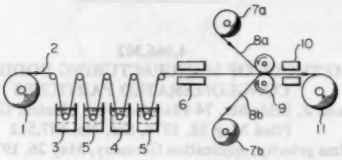
Sanetoshi Tabata, Hirakata, and Toshiaki Takeuchi, Neyagawa, both of Japan, assignors to Teikoku Piston Ring Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 476,225, June 4, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,716

Claims priority, application Japan, Sept. 12, 1973, 48-102211; Nov. 8, 1973, 48-124930

Int. Cl.² B23K *19/00*

U.S. Cl. 228—187 **1 Claim**



1. A process for producing metal composite material comprising the steps of:

1. forming an aluminium layer bonded to a surface of a substrate material consisting of a metal other than aluminium by (a) superimposing an aluminum foil on the surface of the substrate material, (b) cold pressure bonding the foil and substrate at a draft of from 5 to 22.7 % (c) subjecting said bonded material to a diffusion heat treatment at a temperature of 200° to 400° C and then

2. bonding an aluminum material to the bonded material produced by step (1) by (d) superimposing the aluminum material on said aluminium foil layer surface and (e) hot pressure bonding said superimposed aluminium material to said metal substrate material through said aluminium foil layer at a draft of said superimposed material of from 5 to 60% and at a temperature lower than the metling point but not lower than the recrystalizing point of said aluminium material, to thereby produce a composite material.

4,046,305

METALLIC BONDING METHOD

Dennis Cockburn Brown, and Reginald Murray, both of Leamington Spa, England, assignors to Associated Engineering Limited, England

Filed Oct. 28, 1975, Ser. No. 626,126

Claims priority, application United Kingdom, Nov. 15, 1974, 49480/74

Int. Cl.² B23K *35/30*

U.S. Cl. 228—194 **22 Claims**

1. A method of bonding together at least two pieces of aluminium alloy by eutectic diffusion bonding using, between the surfaces to be joined, an interlayer selected from the group consisting of copper and copper-rich alloys including at least about 95% copper and in which said pieces are heated and said surfaces to be joined are pressed together to form a metallurgical bond therebetween, characterized in that at least one of said pieces is of high silicon aluminum alloy and at least one other of said pieces is of an aluminium alloy having a melting point not lower than that of said high silicon aluminum alloy and in that said one piece of high silicon aluminum alloy and said other piece of aluminium alloy are heated to a temperature in the range of about 515° to about 530° C, whereby to form between the joined surfaces a metallurgical bond consisting of a complex alloy of at least said high silicon aluminum alloy and said interlayer.

4,046,306

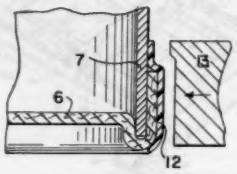
COMPOSITE END PANEL FOR CAN OR SIMILAR CONTAINER

Ann E. Cass, Argo, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 645,966

Int. Cl.² B65D *3/10*; B21D *31/00*

U.S. Cl. 229—5.7 **10 Claims**



1. An improved method of fastening a paper laminate panel to the body of a can or similar container comprising the steps of:

cutting the end panel, having interior and exterior surfaces, from a sheet of laminate material,

applying an adhesive sealant to the interior surface periphery of said end panel.

securing sand adhesive-covered end panel to an end of said container body with at least a portion of said interior surface periphery overlying the outer surface of said body,

applying an annular band or hoop of heat-shrinkable plastic over the exterior surface periphery of said end panel, and

heating said band or hoop to shrink the same, thereby further securing said end panel to said body and preventing end panel delamination and separation.

4,046,307

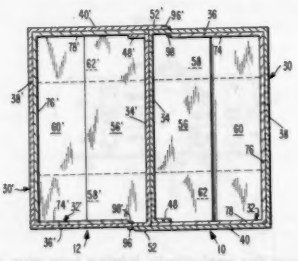
TWO CELL BULK CONTAINER

Vernard S. Booth, and Billy W. Oswalt, both of Albany, Ga., assignors to Olinkraft, Inc., West Monroe, La.

Filed June 10, 1976, Ser. No. 694,756

Int. Cl.² B65D *5/72, 5/48*

U.S. Cl. 229—15 **9 Claims**



1. A two cell bulk container body comprising

a pair of sleeves each formed from four serially joined sleeve wall panels and an inside joint flap on one end panel of said series of sleeve panels,

said one panels of the pair of sleeves being bonded together face to face to form opposite side seams between the sleeves,

a pair of liners formed from three serially joined liner wall panels bonded on the inside of the other wall panels of the respective sleeves,

each of said pair of sleeves including an integral outside joint flap on the other end panel of the series of four sleeve panels, and

said outside joint flaps extending over the opposite side seams between the pair of sleeves and being secured to the wall panels adjoining the one panels of the opposite sleeves.

4,046,308

PACKAGING

Stanley Milton Silver, London, England, assignor to Paxall, Inc., Chicago, Ill.

Filed Mar. 13, 1972, Ser. No. 234,105

Claims priority, application United Kingdom, Mar. 24, 1971, 7709/71; Apr. 21, 1971, 10351/71; Apr. 21, 1971, 10352/71; June 9, 1971, 19550/71

Int. Cl.[2] B65D *5/72, 5/02*

U.S. Cl. 229—17 R **10 Claims**

1. A generally tubular package formed from a blank with heat-sealable characteristics, which blank is formed from laminated material comprising a substratum and sheeting de-laminably adhered to said substratum by a heat-weakenable laminant, said sheeting having a stretchable thermoplastic surface,

said blank having parallel fold lines which define front and rear body walls and a pair of opposed body side walls and having end closure panel means hingedly connected to one end of each body wall,

said blank also having a flange panel hingedly connected to one said body wall at a lateral edge of said blank, said flange panel being connected to another part of said blank at the other lateral edge to form said blank into a tubular package,

said end closure panel means including a main closure panel hinged to said rear wall closing the opening at said one end of said tubular package, including flanking gusset panels hinged respectively to said main closure panel and to one of said body side walls and being outfolded to lie in the plane of said main closure panel, and including a flange closure panel hinged to said front wall,

tab means connected to the front edge of said main closure panel and lying in said plane of said main closure panel, and

corner panels disposed between said gusset panel means and said tab means,

said sheeting surface of said blank between each of said outfolded gusset panel means and said flange closure panel being stretched outward therebetween,

the sheeting surface of said outfolded gusset panel means being heat-sealed to itself, the sheeting surface of said tab means being heat-sealed to the sheeting surface of said flange closure panel, and said outward stretched sheeting surface being heat-sealed to the sheeting surface of said corner panels to totally seal the end of said closed tubular package, and

said main closure panel and its attached gusset panel means and tab means being delaminated from the respective sheeting surfaces thereof.

4. A blank with heat-sealable characteristics suitable for packaging, said blank being formed from laminated material comprising a substratum and sheeting de-laminably adhered to said substratum by a moisture-resistant heat-weakenable laminant, said sheeting surface having cohesive characteristics when heated; said blank having parallel fold lines defining at least two pairs of opposable body walls and having end closure panel means hingedly connected to one end of each body wall along a line perpendicular to said parallel fold lines, additional parallel fold lines at both lateral edge areas of the blank defining flange panels which are hingedly connected to said body wall portions of said blank, said blank being proportioned so that when it is folded into flattened tubular shape said flange panels can be disposed in surface-to-surface contact with each other at a substantial angle to the plane of said flattened tube to create a fin-type side seam by the application of heat and pressure, which side seam forms said blank into tubular configuration.

4,046,309

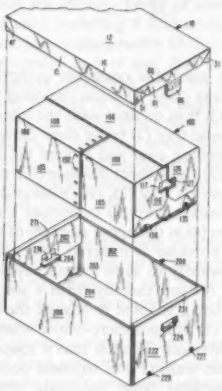
SHIPPING BOX

Lewis D. Poggiali, West Chester, Ohio, assignor to Olinkraft, Inc., West Monroe, La.

Filed July 8, 1976, Ser. No. 703,708

Int. Cl.[2] B65D *5/24, 5/22*

U.S. Cl. 229—23 R **7 Claims**



1. In a shipping box, the combination comprising

a generally rectangular inner container having a bottom panel, side and end panels integral with the bottom panel, and a top panel integral with the side panels,

said top panel including a pair of left and right parts folded toward each other and a pair of folded end portions integral with said pair of parts and overlying said end panels,

interlocking means between said end portions and said end panels to latch said inner container in a closed position,

said interlocking means including an opening in each pair of said portions and a folded section on each end panel extending through said opening adjacent thereto,

said bottom panel including a pair of panel elements folded toward each other and having edges which overlap each other,

a generally rectangular outer container having a bottom wall, spaced side walls integral with the bottom wall, and spaced end walls integral with the bottom wall,

each end wall including three sections disposed in juxtaposition to each other,

a handle opening in each of said three sections and in alignment with each other,

locking tab means on one of said three sections and extending through the openings of the other two sections to lock all three sections together as a unit,

said one section including a folded panel portion disposed contiguous another of said three sections,

a flap projecting from said panel portion and engaging said locking tab means to keep the same in a locked position,

a lid covering top portions of said inner and outer containers, and

a handle extension on each end of said lid extending into the handle opening of its adjacent end wall.

4,046,310

CONTAINER

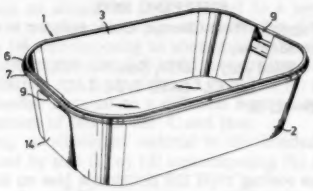
Nils-Ake Gustafsson, Halmstad, Sweden, assignor to Sprinter Pack AB, Halmstad, Sweden

Filed June 14, 1976, Ser. No. 695,978

Claims priority, application Sweden, June 17, 1975, 7506938

Int. Cl.[2] B65D *5/56, 5/20*

U.S. Cl. 229—30 **5 Claims**



1. A nestable, stackable container comprising a generally conical-shaped tray (2) of a carton provided with a tray (3) of plastic film which is in contact with the interior of the carton tray (2), said plastic tray (3) being deep drawn into the carton tray (2) and extending over and around the upper edge (8) of the carton tray (2) and a short distance downwardly along the exterior of the carton tray (2), characterized in that each end wall (5) of the carton tray (2) comprises a centrally situated cut-away portion (4) at the upper edge (8) of said end walls (5), through which portions of material from said plastic tray (3) are pressed outwardly so as to extend beyond the exterior of the carton tray (2) and thereby form a stacking lip (9), said stacking lip (9) being adapted to engage the upper edge (8) of a like container (1) situated there-below when stacking a number of such containers (1) such that a space is provided between the bottom walls (11) of adjacent containers to thereby prevent the container from becoming wedged or jammed when nested into another container.

4,046,311

RETURN MAIL CONTAINER

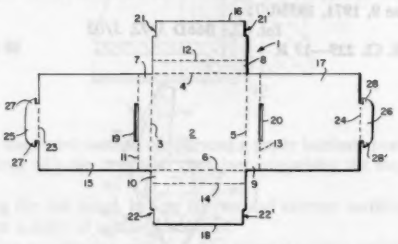
Joseph Voytko, Lakewood, Ohio, assignor to Westvaco Corporation, New York, N.Y.

Filed July 16, 1976, Ser. No. 705,774

Int. Cl.[2] B65D *5/10*

U.S. Cl. 229—40 **1 Claim**

1. A tamperproof return mail container for packaging a generally flat object, formed from a one-piece blank of paperboard or the like comprising a centrally located quadrilateral main panel of substantially the same dimensions as the packaged object, a plurality of side wall panels foldably attached to the edges of said main panel, said side wall panels each having a width substantially equal to the width of its attached main panel edge and a length substantially equal to the height of the packaged object, a first pair of top closure flaps designated respectively a mailing address flap and a return address flap foldably attached to two opposed side wall panel, said first pair of top closure flaps each having a width substantially equal to the width of its attached side wall panel and a length substantially equal to the full size of the first dimension of the packaged object wherein said first pair of top closure flaps are adapted to alternately overlap one another to cover the packaged object, said first pair of top closure flaps each further including at least one locking tab foldably attached along an outer free edge thereof and at least one tab receiving slot located substantially along the foldable connection between said top closure flap and side wall and opposite the locking tab attached to the outer free edge thereof, wherein said locking tabs have a nominal width substantially equal to the length of the attached foldable connection with integral locking ears projecting from each side thereof, and said tab receiving slots each have a length substantially equal to the nomimal width of said locking tabs and a width substantially equal to the thickness of the blank material from which the container is formed, and a second pair of top closure flaps foldably attached to the remaining opposed side wall panels, said second pair of top



closure flaps each having a width substantially equal to the width of its attached side wall panel and a length no greater than about one-half the size of a second dimension of the packaged object, said second pair of top closure flaps each including notched portions at each side thereof near their free ends for accomodating an unused locking tab, wherein the container is prepared for mailing when the return address flap is folded over the packaged object and second top closure flaps to place the unused locking tab thereon in the region provided by the notched portions at one side of said second top closure flaps, and the mailing address flap is folded over the return address flap and the locking tab attached thereto is inserted in the tab receiving slot of said return address flap so as to position the integral locking ears thereof beyond the ends of said tab receiving slot, and the container is prepared for return mail, after severing the locking tab from the mailing address flap to open the container, with a reverse folding sequence wherein the return address flap is folded over the mailing address flap and the locking tab attached thereto is locked in the tab receiving slot of said mailing address flap.

4,046,312

SECURITY TOTE BOX

Bradford J. Krizan, Plymouth, Minn., assignor to Liberty Carton Co., Minneapolis, Minn.

Filed Feb. 25, 1976, Ser. No. 661,346

Int. Cl.[2] B65D *45/00*

U.S. Cl. 229—45 R **5 Claims**

1. A tote box with a security lid comprising:

a container comprised of four upstanding sidewalls disposed in a generally rectangular configuration;

a bottom wall extending between the bottom edge portions of said sidewalls;

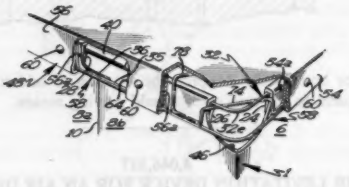
a rigid reinforcing rim extending around the top periphery of said container;

means holding said rim in engagement with top edge portions of said sidewalls;

at least one exposed, horizontal locking segment of said reinforcing rim;

a lid positioned on top of said sidewalls in covering relation to said container, said lid being formed from bendable material and having side panels depending downwardly over the top ends of said container sidewalls and folded upwardly on themselves to define pockets around the periphery of said lid within which a strengthening rim is contained;

a locking tongue on said lid strengthening rim in alignment with said locking segment of said reinforcing rim, said locking tongue projecting unwardly and being biased under said locking segment of said container rim in re-



straining engagement therewith to secure said lid on top of said container sidewalls; and

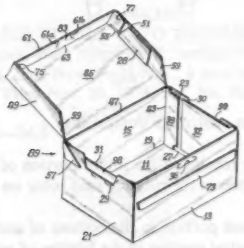
means holding said lid in engagement with top portions of said container peripherally spaced apart from said container rim locking segment comprising two exposed corner segments of said container reinforcing rim, and corner retention bar members extending angularly across two corners of said lid strengthening rim, said retention bar members being positioned under said container reinforcing rim corner segments in restraining engagement therewith to biase said locking tongue when said locking tongue is in engagement with said locking segment of said container reinforcing rim.

4,046,313

ICE CREAM CARTON

George S. Perry, Nashua, N.H., assignor to Kraft, Inc., Glenview, Ill.

Filed Feb. 4, 1976, Ser. No. 655,231
Int. Cl.[2] B65D 5/48, 5/54
U.S. Cl. 206—611 10 Claims



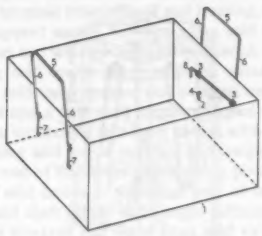
1. A carton for packaging ice cream or the like comprising connected front, bottom and rear body panels; a cover panel hinged to said rear body panel; a closure flap depending from the front edge of said cover panel, an end flap depending from both end edges of said cover panel; two inner end flaps extending toward one another but terminating in spaced apart relation, said inner end flaps being hinged to the end edges of said front and rear body panels; an outer end wall panel hinged at both ends of said bottom body panel; and a removable section generally defined by a severance line and located adjacent the upper edge of each said outer end wall panel, each cover end flap overlying and being adhesively joined to the adjacent removable section and each said removable section being readily yieldable to detachment along the severance line from the outer end wall panel and remaining affixed to the cover end flap when said carton is opened.

4,046,314

HANDLES FOR CARDBOARD OR CORRUGATED PAPER BOXES

William L. Hill, 1219 Seventh St., San Fernando, Calif. 91340

Filed Mar. 2, 1976, Ser. No. 663,114
Int. Cl.[2] B65D 5/46, 25/22
U.S. Cl. 229—52 AW 2 Claims



1. A pair of carrying handles for attachment to opposite sides of cardboard boxes and the like each of which comprises a first wire member having a generally U-shaped configuration with an essentially straight center section as a hand-contacting member and a pair of leg sections extending at approximately right angles from said center section for attachment to an associated box, said leg sections being of essentially identical configuration and each including a first straight section adjacent said center section, a small-radius U-shaped bend portion therealong at the oposite end of said first straight section, a second straight section continuing from the opposite side of said U-shaped bend portion at a slight angle with respect to said first straight section, and an offset portion just short of the end of said leg section terminating in an additional generally downwardly extending straight section at an angle with respect to said second straight section, said leg sections having sharp ends such that, under load, they tend to penetrate the inside surface of the box;

and second elongated members each of which comprises an essentially straight wire member of greater length than the length of the center section of said handle;

the ends of each of said leg sections and said U-shaped bend portions being insertable through the side of said box,

and said second elongated members being insertable through said U-shaped bend portions on the inside of said box to secure said handle to said box, said U-shaped bend portion extending essentially perpendicularly from said straight sections at a distance only slightly greater than the thickness of said associated box such that said second elongated member may be secured tightly between the inside surface of said bend portions and the inside surface of said associated box.

4,046,315

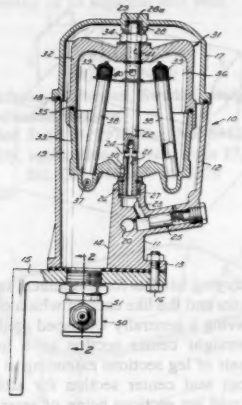
CENTRIFUGAL SEPARATOR WITH DISCHARGE PUMP

James C. Klingenberg, Painesville; Hiralal V. Patel, Euclid, and Philip W. Morse, Cleveland Heights, all of Ohio, assignors to The Weatherhead Company, Cleveland, Ohio

Filed Oct. 23, 1975, Ser. No. 625,128
Int. Cl.[2] B04B 9/06, 11/02
U.S. Cl. 233—4 6 Claims

1. A centrifugal separator for separating contaminants from contaminated fluids and which may be mounted in a variety of positions relative to an engine block, comprising shroud means defining a first chamber, a vertically extending spindle within

said shroud means and having a hollow rotor mounted thereon for axial rotation within said shroud means, said hollow rotor defining a second chamber for receiving contaminated fluids to be separated, fluid inlet means through said spindle for conducting such contaminated fluids to said second chamber, first pump means in fluid communication with said fluid inlet means to pump fluids to said fluid inlet means, means to rotate said rotor and thereby cause said contaminants in contaminated fluids within said chamber to migrate toward a sidewall of said second chamber under the influence of centrifugal force and to be separated from such contaminated fluids, said means to rotate said rotor comprising tangentially mounted outlet port means on said rotor to cause said rotor to rotate upon dis-



charge of fluid from said second chamber to said first chamber, second pump means comprising a jet pump having a pump chamber in fluid communication with said first chamber to prevent excess fluid buildup in said first chamber which would inhibit rotation of said rotor, a nozzle projecting into said pump chamber, an outlet from said pump chamber aligned with said nozzle, and a passageway communicating with said fluid inlet means, said passageway in turn being in fluid communication with said first pump means and with said nozzle, whereby a portion of said fluid will be delivered by said first pump means to said second chamber and a portion of said fluid will be delivered by said first pump means to said second pump means.

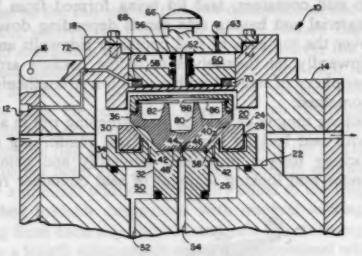
4,046,316

SNAP RING MAGNETIC STOPPING SYSTEM FOR AN AIR DRIVEN CENTRIFUGE

George Norton Hein, Jr., 331 Chesham Ave., San Carlos, Calif. 94070

Filed Apr. 29, 1976, Ser. No. 681,311
Int. Cl.[2] B04B *9/14*
U.S. Cl. 233—23 R 5 Claims

1. An air driven centrifuge comprising:
a rotor;
air jet means for rotatably driving said rotor;
levitation air jet means for supporting said rotor on a cushion of air when said air jet means is not operating;
means mounted adjacent said rotor for producing a magnetic field; and
a ferrous metal element located within said rotor and acting cooperatively with said magnetic field producing means



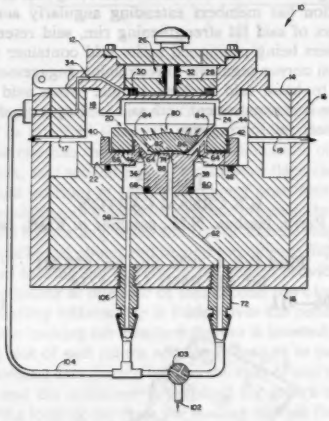
for completely stopping the rotation of said rotor subsequent to the operation of said driving means.

4,046,317

AIR LEVITATION DEVICE FOR AN AIR DRIVEN CENTRIFUGE

George Norton Hein, Jr., 331 Chesham Ave., San Carlos, Calif. 94070

Filed Apr. 29, 1976, Ser. No. 681,313
Int. Cl.[2] B04B *9/14*
U.S. Cl. 233—23 R 11 Claims



1. An air driven centrifuge comprising:
a rotor;
a rotor seat for receipt of the lower portion of said rotor;
driving air jet means for rotating said rotor on a cushion of air;
a central recessed portion in the bottom of said rotor;
a projecting central portion in the bottom of said rotor seat, said central recessed portion and said projecting central portion having similar shapes and dimensions, so that said central recessed portion of said bottom of said rotor and said projecting central portion of said bottom of said rotor seat cooperatively establish a specific confined flow path between said rotor and said rotor seat along said central recessed portion of said rotor; and
means located in said projecting central portion of said rotor seat acting in conjunction with said flow path for introducing a supply of supporting air into said flow path with sufficient velocity, so that the air pressure within said flow path is below atmospheric pressure to hold said rotor within said rotor seat and allow said rotor to decelerate to

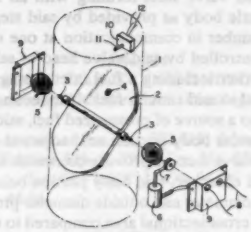
a stable stop when said driving air jet means is not rotating said rotor.

4,046,318

AUTOMATIC BOILER DAMPER

Mervyn Ripley, 24 Canton Court, Brooklyn, N.Y. 11229

Filed Feb. 18, 1976, Ser. No. 659,112
Int. Cl.[2] G05D *23/00*
U.S. Cl. 236—1 G 1 Claim



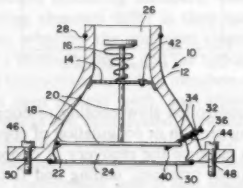
1. The combination of a heating system, a stack venting said heating system, a vane-type damper pivotably secured to said stack about an axle passing through the surfaces of said stack, the improvement comprising an automatic boiler damper having an electrically operated solenoid coil adapted to manipulate said vane into an open position, venting means adapted to permit a small amount of stack gases to emerge through said vane when said vane is in a closed position, temperature sensing means, said temperature sensing means including a temperature sensing element adapted to sense the temperature of said small amount of stack gases, said temperature sensing means adapted to supply energizing power to said solenoid coil upon reaching a pre-determined temperature level thereabout, said temperature sensing means including a pair of normally open contacts, said pair of normally open contacts being disposed in electrical touching engagement to each other when the temperature of said temperature sensing element reaches a preset temperature level, said pair of normally open contacts in a series electrical circuit with said solenoid coil, said series electrical circuit provided with operating power derived from said heating system when said heating system is electrically operated to produce heat.

4,046,319

ADJUSTABLE AUTO THERMOSTAT

David C. Myers, West Nyack, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Nov. 20, 1975, Ser. No. 633,662
Int. Cl.[2] F01P *7/02*
U.S. Cl. 236—34.5 3 Claims



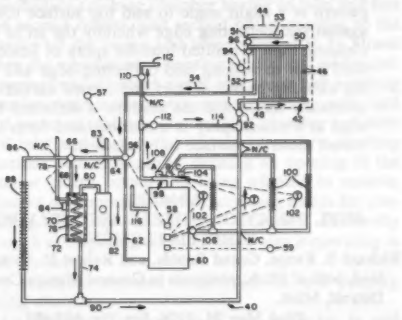
1. A thermostat with external adjusting means for varying the temperature sensitivity thereof comprising housing means, influent means and effluent means in said housing means for directing the flow of a fluid into and out of said housing means, valve means in said housing means for controlling the flow of fluid through said housing means, temperature response means operatively connected to said valve means for controlling the opening and closing of said valve means in response to a change of temperature of a fluid in said thermostat, said temperature response means comprising means that expand in response to an increase in temperature and contracts in response to a decrease in temperature, said temperature response means being arranged to bias said valve means into valve seat means mounted in said housing when fluid in said housing drops in temperature and to bias said valve means out of said valve seat means in response to an increase in temperature of fluid in said housing, adjusting means for said temperature response means to increase or decrease the sensitivity thereof to a change of temperature of a fluid in said thermostat, said adjusting means comprising shaft means passing through said housing, said shaft means operatively connected to said temperature response means, whereby adjustment of said adjusting means may be made externally of said housing, said shaft means engaging support means for supporting said temperature response means and which is adjustable through said shaft means for moving said temperature response means towards and away from said valve means, said support means comprising lever means and a first shaft member angled to intersect said lever means, secured to said lever means with said shaft member supporting said valve member and temperature response means, one end of said lever means being pivotally secured to the side of said housing, the other end of said lever means receiving said shaft means at an angle sufficient to move said lever means towards and away from said valve means when said shaft is moved in and out of said housing.

4,046,320

FIREPLACE BOILER HEATING SYSTEM FOR HOT WATER TYPE FURNACES

William A. Johnson, 12406 Taylorsville Road, Louisville, Ky. 40299, and Roy O. Johnson, 12015 Donohue Ave., Louisville, Ky. 40243

Continuation-in-part of Ser. No. 573,897, May 2, 1975, abandoned. This application May 21, 1976, Ser. No. 688,619
Int. Cl.[2] F24D *3/02*; F24B *9/04*
U.S. Cl. 237—8 C 8 Claims



1. A system for heating homes and other buildings comprising a fireplace water boiler,

a furnace having a water boiler,

means for conveying relatively hot water from said fireplace boiler to said furnace boiler,

radiating means for dissipated heat from water introduced therein,

valve means for diverting said relatively hot water from said furnace boiler to said radiating means when the temperature of the water in said furnace boiler is at least equal to a first preselected value,

cold water return means for conveying relatively cold water from said radiating means to said fireplace boiler, and

a water pump connected between said cold water return means and said fireplace water boiler adapted to forceably circulate water through said system when the temperature

of the water in said fireplace boiler is at least equal to a second preselected value.

4,046,321

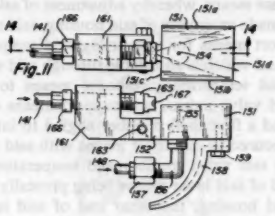
HIGH PRESSURE SPRAY CLEANING HEAD

Charley L. Hewett, Northglenn, Colo., assignor to Kem-O-Kleen, Inc., Englewood, Colo.

Division of Ser. No. 564,858, April 3, 1975, Pat. No. 3,997,114. This application July 26, 1976, Ser. No. 708,721

Int. Cl.[2] B05B *7/08*

U.S. Cl. 239—420 **6 Claims**



1. A spray head operated by a fluid under pressure for spray cleaning a surface comprising:

a distributor body of a cleaning chemical corrosion-resistant material having a top surface and a front surface substantially normal to said top surface, said front surface and top surface meeting at a deflecting edge and having a discharge aperture in said top surface through which a jet of a cleaning chemical fluid is delivered under pressure; and

spray nozzle means adjacent the distributor body having an inlet adapted to receive a supply of heated carrier fluid under pressure, said spray nozzle means having a tip located at the rear of and above the top surface of said distributor body and said discharge aperture for producing a substantially horizontal, generally planar, fan-like pattern of heated carrier fluid and directing said spray pattern at a slight angle to said top surface toward and against said deflecting edge whereby the jet of chemical cleaning fluid is emitted into the spray of heated carrier fluid prior to striking said deflecting edge and whereby the cleaning chemical fluid and heated carrier fluid are intimately mixed and the mixture is deflected from said edge as a mixed spray in a concentrated form that is directed toward a surface to be cleaned.

4,046,322

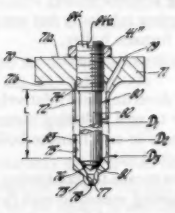
FUEL INJECTION NOZZLE ASSEMBLY WITH STRETCH ELEMENT

Richard S. Knape, Grand Rapids, and Robert D. Straub, Westland, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 21, 1976, Ser. No. 688,695

Int. Cl.[2] B05B *1/30*; F02M *61/16*

U.S. Cl. 239—533.7 **3 Claims**



1. In an injector nozzle assembly, a nozzle body having a spray tip at one end thereof, the nozzle body having a stepped bore extending from the opposite end of the nozzle body from said spray tip to communicate with the spray tip and providing at the spray tip an annular valve seat concentric with said stepped bore, a valve having a valve head and a stem extending therefrom said valve being positioned to extend through said stepped bore in said nozzle body with said valve head normally positioned in loaded abutment against said valve seat, the end of said stem opposite said valve head being connected to said opposite end of said nozzle body to prevent axial movement of said end of said stem in at least one direction relative to said nozzle body, said valve stem forming with an inner annular wall in said nozzle body as provided by said stepped bore an annular fuel chamber in communication at one end with said valve seat as controlled by said valve head of said valve, said nozzle body further including a fuel inlet passage means connected at one end to said annular fuel chamber and connectable at its other end to a source of pressurized fuel, said nozzle body including an annular body portion next adjacent said spray tip encircling said valve stem to provide therewith at least part of said annular fuel chamber, said body portion being of a predetermined inside diameter and outside diameter providing a thin wall of reduced cross sectional area compared to the remaining portions of the nozzle body and of a predetermined longitudinal length whereby, when fuel at a predetermined pressure is in said annular fuel chamber, said body portion is stretched to effect unseating of said valve seat from said valve head and, when the pressure of fuel in said annular fuel chamber decreases, said body portion contracts so that said valve head is again seated against said valve seat.

4,046,323

PROCESS FOR CONTROLLED SLOW COOLING OF NON-FERROUS SMELTING SLAGS

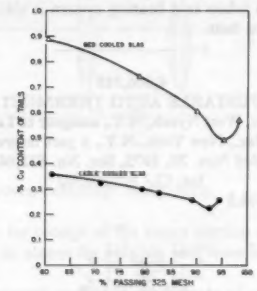
George C. McKerrow, Toronto; Albert Pelletier, and Christopher J. Newman, both of Noranda, all of Canada, assignors to Noranda Mines Limited, Toronto, Canada

Filed May 12, 1976, Ser. No. 685,907

Claims priority, application Canada, Feb. 9, 1976, 245274

Int. Cl.[2] B02C *23/10*; C03B *17/00*

U.S. Cl. 241—23 **13 Claims**



1. Process for controlled slow cooling of copper smelting slags for promoting growth or coagulation of copper particles in the slag and so enhance the recovery of copper contained therein by subsequent crushing, milling and flotation operations, comprising the steps of:

a. pouring the molten slag into a ladle having a capacity of greater than about 10 tons

b. allowing the slag to cool slowly and solidify in the ladle at least to a point where the temperature at its center is below about 1800° F and a shell is formed which is strong enough to withstand dumping from the ladle;

c. dumping the slag from the ladle as a single piece;

d. allowing the dumped slag to cool until its center is substantially solidified;

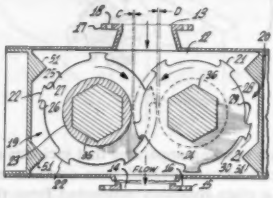
e. breaking the dumped slag into small pieces to enhance further cooling of the slag;
f. crushing the small pieces of slag to approximately 0.25 inch;
g. feeding the crushed slag to a grinding mill; and
h. feeding the ground slag to a flotation circuit to recover copper.

4,046,324

SOLID WASTE COMMINUTOR

Joseph W. Chambers, P. O. Box 2449, Huntington Beach, Calif. 92647

Continuation-in-part of Ser. No. 372,818, June 22, 1973. This application Feb. 4, 1976, Ser. No. 655,094
Int. Cl.[2] B02C *13/06, 23/36*
U.S. Cl. 241—46.06 10 Claims



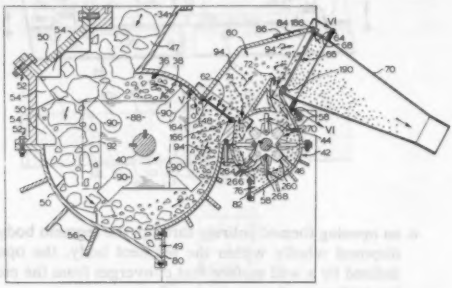
1. Apparatus for comminuting solid waste material comprising:
a casing defining therein a comminution chamber with inlet and outlet ports thereto disposed on opposing sides of said comminution chamber and adapted for connection in a solid waste disposal line;
a comminutor assembly including cooperating substantially parallel first and second shredding stacks located in said comminution chamber and respectively having a plurality of first concentric laminar cutting elements mounted on a first shaft is interspaced relationship with a plurality of second laminar cutting elements mounted concentrically on a second shaft, each cutting element having teeth shaped for cutting in both of two opposite directions of rotation, and wherein the cutting elements of each stack are positioned between and separated in an axial direction by laminar spacers which are coplanar with the elements of the other stack whereby a cutting element from one shredder and a spacer from the other shredder form a pair of interactive shredding members, wherein the teeth of said cutting elements differ in their maximum radial dimensions, whereby the minimum clearance between the teeth of a cutting element and the opposing spacer within a pair of interactive shredding members differs as between different ones of said teeth, and wherein said first and second stacks are compressed between first and second distally opposed bearing plates which receive said first and second shafts, said bearing plates being secured to said casing in compression against said stacks;
means for securing said first and second bearing plates to said casing;
gearing means disposed on adjacent ends of said first and second shafts for coupling the rotations thereof in common, to thereby effect counter-rotation of said shafts; and
drive means comprised of a power source and a system of meshed gears arranged as a speed reducing system and adapted for connection to an end of said first shaft for driving said first shaft in rotation.

4,046,325

APPARATUS FOR CRUSHING ROCK, STONE AND LIKE MATERIAL

Steve Tucsok, 104-43 Suncrest Dr., Delta, British Columbia, and Elemer Fogarassy, 6519 Markay Avenue, South Burnaby, British Columbia, both of Canada

Continuation of Ser. No. 594,378, July 9, 1975, abandoned. This application June 1, 1976, Ser. No. 691,642
Int. Cl.[2] B02C *13/09*
U.S. Cl. 241—73 17 Claims



1. Apparatus for crushing rock, stone and like material, the apparatus being operable selectively in a mode for crushing dry material or in a mode for crushing wet material, and the apparatus comprising:
a casing defining:
a. a primary crushing chamber having an inlet to receive material to be crushed, and first and second outlets, said first outlet being adapted to receive first screening means for controlling the size of material delivered through said first outlet when the apparatus is operating in said dry mode, and said first outlet being adapted to be closed when the apparatus is operating in said wet mode, said second outlet opening to the exterior of the casing and being adapted to be closed when the apparatus is operating in said dry mode;
b. a secondary crushing chamber having an inlet and first and second outlets, said second outlet opening to the exterior of the casing and being adapted to be closed when the apparatus is operating in said dry mode; and,
c. a passageway disposed above said secondary crushing chamber, said passageway communicating with said first outlet of said primary crushing chamber and with said inlet and first outlet of said secondary crushing chamber, said passageway defining an opening to the exterior of the casing and being adapted to receive, adjacent said opening, second screening means for controlling the size of material delivered outwardly through said opening when the apparatus is operating in said dry mode;
a rotary impactor mounted for rotation in said primary crushing chamber;
means for adjusting the position of said impactor in said primary crushing chamber between a first position in said dry mode of operation of the apparatus and a second position in said wet mode of operation of the apparatus; and,
a rotary hammer mill mounted for rotation in said secondary crushing chamber.

4,046,326

SHELL LINER ASSEMBLY

Darrell R. Larsen, Salt Lake City, Utah, assignor to Minneapolis Electric Steel Castings Company, Minneapolis, Minn.

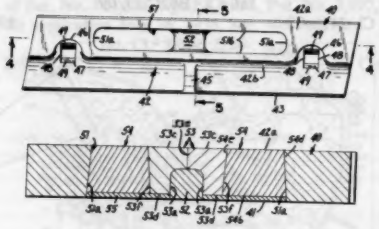
Continuation-in-part of Ser. No. 629,503, Nov. 6, 1975, Pat. No. 4,018,393. This application July 19, 1976, Ser. No. 706,739
Int. Cl.[2] B02C *17/22*
U.S. Cl. 241—182 24 Claims

1. A removeable liner assembly for the shell of an ore grind-

ing machine, the assembly including a plurality of liner segments each of which comprises:

a. a segment body of predetermined size and configuration, the segment body being formed from a first material and defining a mounting surface and a grinding surface;

b. means for connecting the segment body to the shell of the ore grinding machine;



c. an opening formed entirely through the segment body and disposed wholly within the segment body, the opening defined by a wall surface that converges from the mounting surface to the grinding surface;

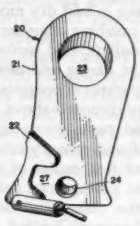
d. and insert means formed from a second material and conforming generally to the shape and size of the opening, the insert means being disposed in the opening in wedging relation for retaining engagement thereby.

4,046,327

RELEASABLE LOCK

Dennis A. Cranor, Milwaukie, Oreg., assignor to ESCO Corporation, Portland, Oreg.

Filed Mar. 19, 1976, Ser. No. 668,478
Int. Cl.² B02C *13/28*
U.S. Cl. 241—197 **4 Claims**



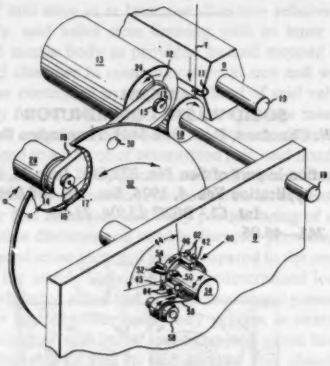
1. A releasable lock for securing together two parts of a wearable device comprising first and second parts, aligned through passages in said parts for receiving a locking pin, a pin in said passages maintaining said parts in coupled relation, one of said parts being equipped with an exterior surface, a bore in said one part communicating with said exterior surface and extending inwardly therefrom transversely to and communicating with the passage in said one part, said pin having a transverse bore alignable with said one part bore when said pin is maintaining said parts in coupled relation, and a ductile, elongated rivet mounted in said bores having inner and outer ends, the inner end of said rivet being the end first introduced into said bores, one of said pin and said one part being equipped with a counter bore receiving said rivet inner end and adapted to accommodate deformation of said rivet inner end resulting from force applied to said outer end, said rivet being more ductile than said pin whereby an axial force applied to said pin preferentially shears said rivet, said rivet prior to deformation having a length greater than the sum of the lengths of said bores whereby said rivet outer end, prior to inner end deformation, protrudes outwardly of said exterior surface.

4,046,328

APPARATUS TO ASSIST DOFFING PACKAGES IN A YARN WINDUP

Nathan Cloud, Wilmington, Del., and James Edwin Smith, Waynesboro, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 10, 1976, Ser. No. 684,932
Int. Cl.² B65H *67/04*
U.S. Cl. 242—18 A **1 Claim**



1. In a yarn winding apparatus that includes a frame, a pair of windup chucks cantilevered from opposite ends of an arm attached to a plate rotatably supported from the frame by a shaft, a drive roll positioned to contact yarn on one package support on one of the chucks in a winding position while the other chuck carrying another support is in a doffing position, said arm being attached to said plate in a fixed relationship during winding and being pivotally attached to said plate for relative rotary movement thereto during doffing, the improvement comprising: a collar rotatable on said shaft, said collar having a portion of its periphery cut out to provide an open section over part of its circumference, said open section being defined by two radial faces, a pin extending radially outward from said shaft into said open section; a constant force extension spring connected at one end to the periphery of said collar and at its other end to said frame, said spring leading partially around the periphery of said collar to said frame for applying a constant torque in one direction to said collar whereby said pin engages one of said two radial faces and means located near said one of said two radial faces to limit rotation of said collar with respect to said frame in said one direction whereby said shaft is free from the influence of said spring to rotate in said one direction until said pin contacts the other of said two radial faces.

4,046,329

METHOD AND APPARATUS FOR PACKAGING LINEAR MATERIAL

Arnold J. Eisenberg, and Jerome P. Klink, both of Granville, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed June 26, 1975, Ser. No. 590,741
Int. Cl.² B65H *54/02*
U.S. Cl. 242—18 G **14 Claims**

1. The method of collecting linear material on wound packages including the steps of:

a. supplying linear material;

b. rotating a first collet having a package collection region and a temporary collection region;

c. winding the linear material on the collection region of the first collet;

d. rotating a second collet having a package collection region and a temporary collection region, the second collet

including in the temporary collection region a fixed member and a circumferential groove having a generally frusto-conical guide surface adapted to guide the linear material to the fixed member for engagement thereon during transfer of the material from the first to the second collet;

e. laterally moving the advancing material along the first collet from the package collection region to the temporary collection region;

f. contacting the linear material advancing to the first collet with the second rotating collet in the circumferential groove of the temporary collection region such that the material is guided by the guide surface into engagement with the member so that the linear material is moved with the member to thereby begin collection of the material in the temporary collection region of the second collet and

g. laterally moving the material along the second collet from the temporary collection region to the collection region to begin package formation.

4,046,330

STRAND COLLECTING APPARATUS AND METHOD

Dale R. Mueller, Toledo, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 20, 1976, Ser. No. 724,826
Int. Cl.² B65H *54/00, 54/38*
U.S. Cl. 242—18 G **9 Claims**

1. Apparatus for collecting a strand on a rotating collet comprising:

a strand traverse for traversing a strand linearly of the axis of rotation of said collet;

means for oscillating said strand traverse linearly of said axis;

strand guide means for guiding said strand into engagement with said strand traverse;

means for oscillating said strand guide means linearly of said axis;

means for sensing the oscillation of said strand traverse and said strand guide means; and,

means for altering the rate of oscillation of said strand traverse or said strand guide means responsive to said sensing means to maintain the oscillation of said strand

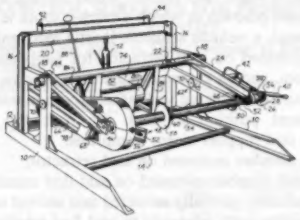
traverse in phase with the oscillation of said strand guide means.

4,046,331

WIRE ROLLER

William Springall Decker, Sr., P.O. Box 671, Stanton, Tex. 79782

Filed Oct. 27, 1976, Ser. No. 736,128
Int. Cl.² B65H *54/00*
U.S. Cl. 242—54 R **10 Claims**



1. A wire roller comprising:

a. a frame,

b. a horizontal beam on the frame,

c. a main axle horizontally mounted on the frame parallel to and forward of the beam,

d. a spindle arm journaled on one end of the main axle with a distal end forward thereof,

e. a power arm journaled on the other end of the main axle with a distal end forward thereof,

f. a spindle mounted for rotational and axial movement parallel to the axle on the distal end of the spindle arm,

g. spool lug means mounted on the distal end of the power arm for drivingly engaging a spool,

h. a hollow spool shaft extending from said spindle to said spool lug means so that a spool may be mounted thereon,

j. driving means mounted on main axle and connected to said power arm for rotating said spool lug means,

k. a U-shaped lift bracket journaled to the frame by

m. trunnions below the main axle,

n. said U-shaped bracket having

i. a bight under the beam and

i. lift arms under the spindle arm and power arms and

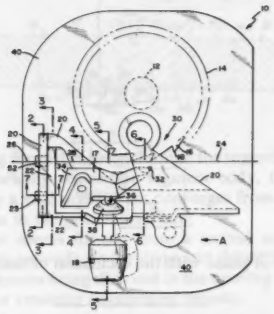
o. a jack between the bight and beam.

4,046,332

SUPPORT FOR SAFETY BELT RETRACTOR INERTIA MECHANISM

Walter Morris Wheeler, Fraser, and Klaus Frederick Ocker, Mount Clemens, both of Mich., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed May 2, 1975, Ser. No. 574,230
Int. Cl.[2] A62B *35/00*; B65H *75/48*
U.S. Cl. 242—107.4 A **4 Claims**



1. In a safety belt retractor having a reel for winding a safety belt thereon, biasing means for biasing the reel in a belt retraction direction, means to lock the reel and thereby restrain an occupant of a vehicle during dangerous situations, said means to lock the reel including a ratchet wheel disposed in a plane and connected to said reel for rotation therewith, said ratchet wheel having ratchet teeth, each of said ratchet teeth having an engagement edge, said ratchet wheel having a ratchet tooth engagement position in which a ratchet tooth is positioned for engagement, a vehicle sensitive inertia mechanism, a support means mounted on said retractor for supporting the inertia mechanism, and an actuating means responsive to said inertia mechanism for engaging said rathcet tooth in said ratchet tooth engagement position to lock the reel; the improvement wherein said support means comprises:

a first member mounted on said retractor;

a second member mounted on said first member, means for adjustably, pivotally mounted said second member during assembly with reference to said first member by pivoting said second member in one plane with reference to said first member, said inertia mechanism and said actuating means being supported on said second member and pivotally movable therewith; and

a fastening means on said first member and on said second member for pre-setting said second member during assembly with reference to said first member after pivoting movement of said second member with reference to said first member, whereby said second member supports said inertia mechanism in a desired position when the retractor is tilted for installation in a vehicle; and wherein:

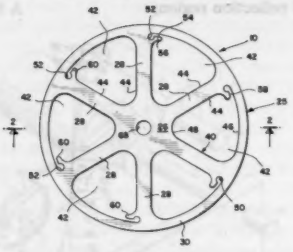
said actuating means has a locking end for engagement with said ratchet teeth of said ratchet wheel, said locking end disposed adjacent to said ratchet teeth of said ratchet wheel prior to engagement thereof, said locking end being pivotally movable with respect to said first member, said locking end of said actuating means having motion in a plane approximately perpendicular to said ratchet wheel plane, said locking end having motion in a circumferential arc, said locking end during said pivoting movement remaining at approximately the same distance from said engaging edge of said ratchet tooth which is in said ratchet tooth engagement position for uniform sensitivity.

4,046,333

YARN MINDER AND ORGANIZER

Walter Kirk, 18 Saucier St., Acushnet, Mass. 02743

Filed July 8, 1976, Ser. No. 703,694
Int. Cl.[2] B65H *49/18*
U.S. Cl. 242—137.1 **4 Claims**



1. A holder adapted to be used in conjunction with skeins in a container, comprising:

a. cover means adapted to extend across one end of the container;

b. coupling means operatively connected to said cover means to retain said cover means in a relatively fixed position with respect to the container;

c. access means including a plurality of spaced apart openings extending through said cover means to permit the user to view the skeins positioned in the container;

d. guide means operatively associated with each of said access means to permit the user to withdraw yarn from each skein independently;

e. said cover means includes:

1. a hub portion centrally located on said cover means;
2. a plurality of integrally formed sprockets extending outwardly from said hub portion; and
3. a rim portion integrally formed with said sprockets, said spacing between said respective sprockets defining said access means in the form of said openings to view the skeins positioned in the container;

f. said coupling means includes a circumferentially downwardly extending lip portion adapted to extend in telescoping relationship to the open end of the container, and

g. said guide means includes:

1. a plurality of apertures, each aperture associated with a respective sprocket; and
2. a passageway communicating between each said aperture and said opening of said access means to permit yarn to be substantially retained within said aperture and removed through said passageway by the user.

4,046,334

AUTOMATIC REVERSAL MECHANISM

Saburo Kato, and Takeshi Takemoto, both of Yokohama, Japan, assignors to Ricoh Co., Ltd., Japan

Filed Nov. 3, 1975, Ser. No. 628,118
Claims priority, application Japan, Nov. 6, 1974, 49-127664
Int. Cl.[2] G03B *1/04*; B65H *17/02*
U.S. Cl. 242—201 **8 Claims**

1. An automatic reversal mechanism comprising, in combination,

a. a pair of rotatable driven members disposed in a common plane with their axes parallel to each other each;

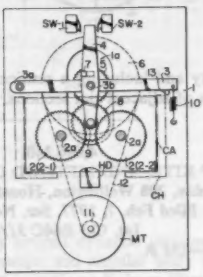
b. a rotatable drive member movable between said driven members and in a direction perpendicular to a line connecting their axes, to peripherally engage either driven member to transmit a driving force thereto;

c. reversible drive means connected to said drive member to rotate said drive member in a selected direction;

d. means operable, in accordance with the direction of rotation of said drive member, to move said drive member into

peripheral driving engagement with a respective one of said driven member;

e. means biasing said drive member toward said connecting line; said driving member responsive to the reaction force exerted thereon by the then-engaged driven member, moving away from said connecting line against the force of said biasing means until such reaction force biases the force of said biasing means; said drive member, responsive



to an increase in such reaction force beyond a predetermined value, due to an increased load on the then-engaged driven member, being displaced further from said connection line;

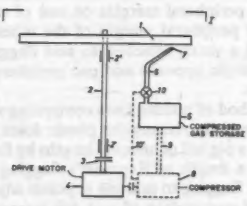
f. switching means operative, responsive to such further displacement of said drive member, controlling said drive means to interrupt rotation of said drive member in its then effective direction of rotation.

4,046,335

HELICOPTERS SAFETY DRIVE

Helmut Osberger, A 3491 Strass bei Krems, Niederosterreich, Austria

Filed June 26, 1975, Ser. No. 590,531
Int. Cl.² B64C *27/18*
U.S. Cl. 244—17.19 **2 Claims**



1. A helicopter comprising:

at least one rotor;

clutch means operatively declutchably coupled to said rotor for operatively disengaging with said rotor in an emergency;

main motor means for directly driving said rotor via said clutch means;

a storage of compressed gas adapted to contain a supply of compressed gas;

at least one emergency drive means for directly rotating said rotor and for starting and being operated in event of emergency by means of said compressed gas from said storage of compressed gas;

said emergency drive means comprising nozzles and supply ducts connected to said storage of compressed gas, said nozzles being directed from below the rotor angularly upwardly and radially outwardly toward the rotor so that said compressed gas is discharged from said nozzles to set the rotor into rotation when said emergency drive means is operated; and

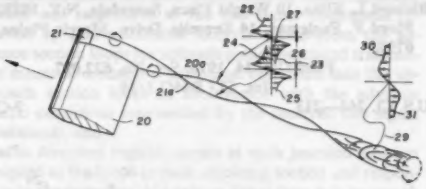
said clutch means for disengaging said main motor means from said rotor in said emergency.

4,046,336

VORTEX DIFFUSION AND DISSIPATION

James L. Tangler, Fort Worth, Tex., assignor to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 577,024, May 13, 1975, abandoned. This application June 23, 1975, Ser. No. 589,053
Int. Cl.² B64C *3/26*
U.S. Cl. 244—198 **12 Claims**



12. An aircraft lifting structure which comprises:

a main blade structure adapted to be secured in lifting relation to an airframe at the root thereof and having a vortex forming tip, and

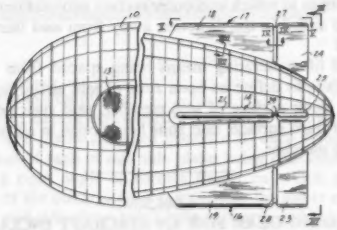
a single sub-wing structure rigidly fixed from said tip with the absolute angle of attack of the sub-wing structure equal to the absolute angle of attack of the main blade with a discrete streamwise junction with the tip of said blade structure for dividing said vortex into two vortices of about same strength separated spanwise by a distance greater than about one-quarter of the blade chord but not greater than about one-half of the blade chord in the tip region.

4,046,337

HINGED CONTROL SURFACES FOR PRESSURIZED HOT AIR AIRSHIP

Roger R. Parsons, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed Jan. 23, 1976, Ser. No. 651,911
Int. Cl.² B64B *1/02*
U.S. Cl. 244—96 **5 Claims**



1. A collapsible storable hot air airship comprising in combination;

a horizontally extending elongate aerodynamic shaped hot air envelope for forming an airship;

pressure hot air generating means carried on the envelope for pressurizing the envelope with heated air during flight;

a collapsible storable inflatable hollow first tail member at the aft end of the airship extending radially therefrom for stabilizing the flight of the airship and being in hot air communication with the interior of the hot air envelope to be inflated by the hot air within the envelope;

a collapsible storable hollow inflatable second tail member positioned at the aft end of the first tail member;

flexible hot air communication conduit having spaced paral-

lel walls extending between said first tail member and said second tail member for inflating the second tail member from the hot air of the first tail member;

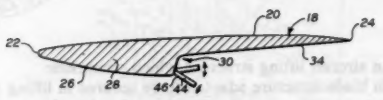
and pilot operated control means for changing the position of said second tail member relative to the envelope and the first tail member for controlling the direction and elevation of flight of the hot air envelope.

4,046,338

AIRFOIL FOR AIRCRAFT HAVING IMPROVED LIFT GENERATING DEVICE

Richard L. Kline, 10 Wright Place, Scarsdale, N.Y. 10583, and Floyd F. Fogleman, 14 Drumlin Drive, Morris Plains, N.J. 07950

Filed Oct. 14, 1975, Ser. No. 622,097
Int. Cl.² B64C *3/38*
U.S. Cl. 244—213 **7 Claims**



1. An airfoil comprising:

a. a first surface extending between the leading edge and the trailing edge of said airfoil;

b. a second surface joined to said first surface along said leading edge and projecting rearwardly in the direction of said trailing edge, said first and second surfaces being in diverging relation to each other;

c. said second surface terminating materially in advance of said trailing edge to define a step-like discontinuity representing a riser portion of said airfoil, said riser portion projecting in the direction of said first surface and terminating in advance thereof; and

d. a third surface connecting the terminal end of said riser portion to the trailing edge of said airfoil;

e. lift generating means pivotably mounted on the terminal end portion of said second surface and projecting rearwardly of said step-like discontinuity, said means comprising a member disposed for movement between a first position in which the outer surface of said member forms a smooth continuation of said second surface and a second position in which said outer surface projects outwardly of said airfoil in the direction away from said third surface; and

f. said lift generating means being spaced from said third surface to define an open zone of said airfoil bounded by the inner surface of said member, said riser portion and said third surface; said zone being open in all positions of said member.

4,046,339

LANDING GEAR FOR AN AIRCRAFT INCLUDING EXPANSIBLE WHEELS

Floyd S. Stancliffe, 5584 Sunny Oaks, San Jose, Calif. 95123

Filed May 5, 1976, Ser. No. 683,270
Int. Cl.² B64C *25/36*
U.S. Cl. 244—103 R **3 Claims**

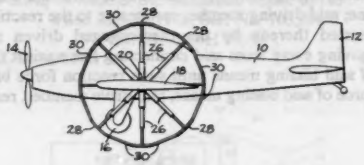
1. Aircraft landing gear for an aircraft having a fuselage and attached wing which comprises

a pair of wheels mounted for rotation on opposite sides of the aircraft fuselage,

each of said wheels being expansible from a relatively small diameter to an expanded diameter whereat the lower most peripheral edge of each wheel is below the aircraft in its normal landing disposition,

each of said wheels including a plurality of telescopic spokes,

each spoke mounting a curved rim section at its outermost



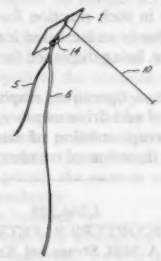
extremity and including a resilient strap joining the extremities of adjacent rim sections.

4,046,340

BOX TOP KITE, AND METHOD OF MAKING SAME

John W. Jordan, 208 Wellington, Houston, Tex. 77076

Filed Feb. 7, 1977, Ser. No. 766,768
Int. Cl.² B64C *31/06*
U.S. Cl. 244—153 R **5 Claims**



1. In a kite, a substantially rectangular member of light rigid material, flagging mounted on said member midway of the ends thereof so that said flagging wraps around the upper and lower surfaces of said member, said flagging being secured adjacent the peripheral margins on one of said surfaces, and adjacent one peripheral margin of the other surface of said surfaces, and a string attached to said flagging adjacent the peripheral margin opposite said one peripheral margin of said other surface.

5. The method of making kites comprising removing the top from a substantially rectangular plastic foam container, forming a tail and a pig tail of unequal lengths by folding over about one sixth of a length of Engineer's flagging at one end and securing said flagging to said top at points adjacent the peripheral edges of one surface of said top wrapping the flagging around the top midway of the edges of said top and securing said flagging on the opposite surface of the top adjacent the edge from which the tails depend, leaving a slack in the flagging and fastening one end of the thread of a spool of thread to the slack portion of the flagging.

4,046,341

AIRCRAFT ANGLE-OF-ATTACK AND SIDESLIP ESTIMATOR

Richard Paul Quinlivan, Binghamton, N.Y., assignor to General Electric Company, Binghamton, N.Y.

Filed Mar. 30, 1976, Ser. No. 672,028
Int. Cl.² G05D *1/08*
U.S. Cl. 244—181 **3 Claims**

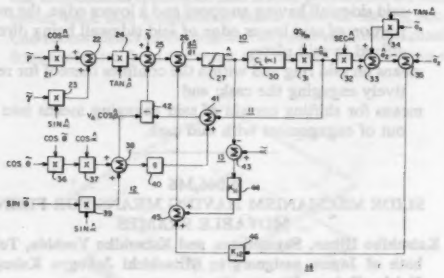
1. In an estimator network for estimating aircraft parameters, such as angle of attack or sideslip angle from measured aircraft parameters such as pitch, roll, speed, acceleration and gravity forces,

a. a network including:

1. means for producing in response to measured aircraft

angular pitch and roll measurements a signal proportional to the rate of change of the aircraft parameter to be estimated,

2. means for integrating the rate of change signal to produce a signal proportional to the estimated parameter, and



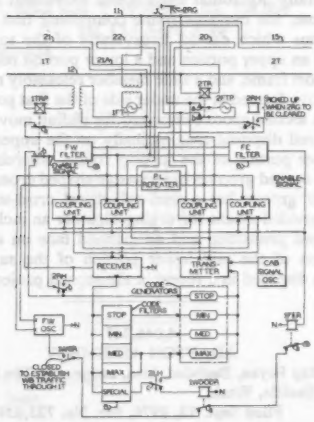
3. means simulating aircraft dynamic response to linear velocities, acceleration and angular body rates along given aircraft axes including a Kalman filter configuration responsive to said integrated rate of change signals from said means for integrating to produce a signal representative of the aircraft dynamic response so as to produce an estimated acceleration signal with respect to given aircraft axes.

4,046,342

WAYSIDE SIGNALING SYSTEM FOR RAILROAD CAB SIGNALS AND SPEED CONTROL

Kenneth J. Buzzard, Pittsburgh, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Aug. 31, 1976, Ser. No. 719,337
Int. Cl.² B61L *21/06, 21/08*
U.S. Cl. 246—34 R **9 Claims**



1. A wayside signaling arrangement for a stretch of railroad track for controlling train carried cab signal apparatus on trains traversing the stretch in either direction, said stretch divided into a plurality of sections between station locations, comprising in combination,

a. a plurality of wire loops laid between the rails of each section and positioned in a predetermined pattern to inductively couple with said train carried apparatus to transmit cab signal commands thereto,

b. a cab signal command transmitter means at each junction location between adjoining sections selectively coupled to the wire loops in an adjoining approach section, in accordance with the established traffic direction, for transmitting cab signal commands selected in accordance with advance traffic conditions,

c. a receiver means at each junction location, selectively coupled to the wire loops in an adjoining advance section in accordance with the established traffic direction and always to the section loops other than those to which the associated transmitter means is coupled, for receiving the cab signal command transmitted by the transmitter means at the next junction in advance,

d. cab signal command selection means at each location coupled between the associated receiver and transmitter means and responsive to the cab signal commands received by said associated receiver means from the advance section loops for activating said associated transmitter means to transmit a cab signal command into the approach section loops in accordance with the advance traffic conditions represented by the received cab signal commands, and

e. traffic direction register means at each junction location coupled to the loops in each adjoining section and responsive to the reception of a unique signal from one approach direction loop for registering the established traffic direction,

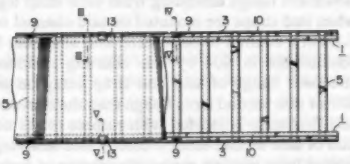
f. said traffic direction register means responsive to the registration of a traffic direction for enabling the coupling of the associated transmitter and receiver means to the correct loop pattern in accordance with the traffic direction established.

4,046,343

CABLE TRAY

Kyosaku Kambara, Tokyo, Japan, assignor to Tokyo Tekko Kabushiki Kaisha, Tokyo, Japan

Filed July 1, 1976, Ser. No. 701,813
Claims priority, application Japan, Dec. 5, 1975, 50-164626
Int. Cl.² H02G *3/04;* F16L *3/22*
U.S. Cl. 248—49 **1 Claim**



1. A cable tray comprising:

a cover plate having downwardly depending side portions;

a pair of side plates arranged opposite to each other, the upper end of each of said side plates being bent outwards and at a right angle to form a flange on which a side portion of the cover plate is overlapped, the lower end of each of said side plates being bent outwards and at a right angle to form a supporting face, the outer end of said supporting face being further bent upwards to form an engaging face, both of said side plates being provided with openings at their lower sides, said openings being arranged to have a predetermined distance therebetween in the longitudinal direction of the side plates, the openings provided on one said side plates corresponding to the openings provided on the other of said side plates;

supporting frames having both ends thereof inserted into registering openings in said side plates and each end of a supporting frame resting on a supporting face;

means for fixing at least some of said supporting frames to said supporting faces;

and fastening means comprising a first fastening member of which one end is bent at right angle to form a pressing face and of which the other end is slanted to form a sliding

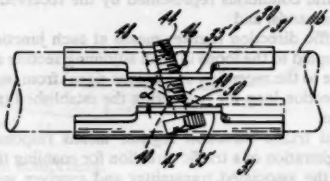
face, a second fastening member similar to said first fastening member and having a pressing face and a sliding face, and a fastening screw passing through a hole provided in said first fastening member and being screwed into a hole in said second fastening member, the overlapped cover plate and flange being sandwiched between the pressing faces of said first and second fastening members.

4,046,344

CONDUIT CLAMPING DEVICE

Robert J. Scanlan, 16350 Woodlawn East Drive, South Holland, Ill. 60473

Filed Oct. 30, 1975, Ser. No. 627,220
Int. Cl.² F16L 3/24
U.S. Cl. 248—72 9 Claims



1. A clamping device for securing a conduit to a support channel having a pair of spaced legs interconnected by a web with the conduit being disposed transversely to said channel and substantially adjacent the web thereof, comprising

first and second straps each having a curved portion for engaging a side of said conduit, a leg extending from one side of said curved portion, and a fastening element at the opposite side thereof;

said leg of each strap having a generally U-shaped end for engaging the end of a respective one of said channel legs;

an abutment flange extending from each strap leg such that when said straps are mounted on said channel on opposite sides of a conduit to be secured said abutment flanges are positionable in side by side abutting relation with the abutment flange of said first strap being on an opposite side of said second strap flange than the curved portion of said first strap is located with respect to the curved portion of said second strap whereby said strap legs are prevented from moving outwardly relative to each other and the conduit therebetween; and

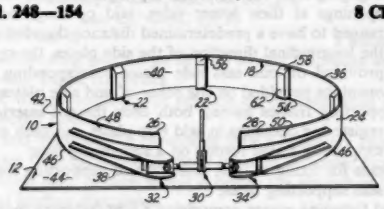
means for securing said strap fastening elements to rigidly clamp said conduit between said strap curved portions and hold said abutting flanges in rigid engagement.

4,046,345

RETENTIVE BASE FOR SHIPPING CASK

George F. Boyd, Sr., Duenweg, Mo., assignor to Tri-State Motor Transit Company, Duenweg, Mo.

Filed July 31, 1975, Ser. No. 600,816
Int. Cl.² A47G 23/02
U.S. Cl. 248—154 8 Claims



1. A retentive base for a shipping cask comprising:

a plate adapted to be secured in a horizontal position on the bed of a supporting vehicle;

a ring carried by said plate and receiving said cask within the confines thereof, said ring having a vertical sidewall perpendicular to said plate, said sidewall being transversely split whereby to present a pair of opposed, free end lips, said sidewall having an upper and a lower edge, the major portion of said lower edge of said sidewall being directly affixed to said plate;

means on said ring and within the confines thereof for retentively engaging the cask; and

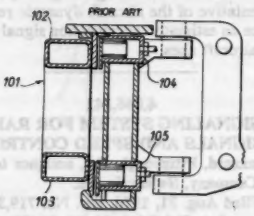
means for shifting certain of said engaging means into and out of engagement with said cask.

4,046,346

SLIDE MECHANISM HAVING MEANS FOR FIXING MOVABLE FRAMES

Katsuhiko Iijima, Sagamihara, and Katsuhiko Yoshida, Tokyo, both of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,562
Claims priority, application Japan, Nov. 14, 1974, 49-131690
Int. Cl.² B61H 7/00
U.S. Cl. 248—298 11 Claims



1. A slide mechanism comprising a movable frame mounted for generally horizontal longitudinal movement along a support frame, the movable frame comprising first and second projections which extend transversely of the support frame adjacent an upper portion and a lower portion respectively of the support frame, and a slide member releasably mounted in a first groove formed in the under side of the first projection and having a second groove arranged for sliding movement along a guide rail disposed longitudinally on the upper side of the said upper portion of the support frame, wherein one of the first and second grooves has a wedge shaped cross-section and the other groove has a semi-cylindrical cross-section, there being provided means for urging together an inclined face on the second projection and an inclined face on a downward projection of the said lower portion of the support frame which is disposed in a recess in the second projection.

4,046,347

ADAPTOR ASSEMBLY

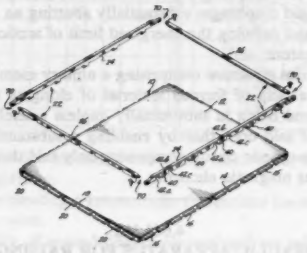
Darold Ray Bryan, Baghdad, Iraq, assignor to The Boeing Company, Seattle, Wash.

Filed Sept. 13, 1976, Ser. No. 723,039
Int. Cl.² B65D 19/00
U.S. Cl. 248—346 10 Claims

1. An adaptor for use with a cargo pallet having first and second sides, first and second ends, and a bottom, said first and second sides having a plurality of outwardly extending, lateral projections thereon adjacent said bottom for use in tieing said pallet down in a first cargo tiedown system, said adaptor for removable interconnection with said pallet for use in tieing said pallet down in a second cargo tiedown system, said adapter comprising:

first and second longitudinal frame members each having an inner side and an outer side, each said longitudinal frame member being positionable adjacent a respective side of

said pallet and having a first plurality of recess means on the inner side thereof for receiving said plurality of lateral projections on said pallet, said first plurality of recess means being spaced along the inner side of each said longitudinal frame member at distances corresponding to the longitudinal spacing of said lateral projections on said pallet, each said longitudinal frame member having second recess means extending laterally into said longitudinal frame member from the outer side thereof for receiving a



movable tiedown member forming part of said second cargo tiedown system, and

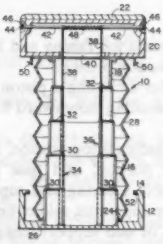
connecting means associated with said pallet and said first and second longitudinal frame members for securing said first longitudinal frame member to said pallet, for securing said second longitudinal frame member to said pallet, and for cooperating with said pallet and said longitudinal frame members to prevent longitudinal and lateral movement of said first and second longitudinal frame members relative to said pallet.

4,046,348

ADJUSTABLE HEIGHT STOOL

John E. Goodwin, 201 W. 157th St., Harvey, Ill. 60426

Filed Nov. 2, 1976, Ser. No. 738,036
Int. Cl.[2] A47C *3/40*
U.S. Cl. 248—423 **7 Claims**



1. A stool comprising:

a hollow base,

a seat,

vertical telescoping support means between the interior of said base and the bottom of said seat for adjustably moving said seat relative to said base, and

means between said base and seat for retaining said telescoping support means in a plurality of adjusted vertical positions,

said telescoping support means including a plurality of cylindrical telescoping sections, the lowermost of said sections being fixed to the interior of said base, the uppermost of said sections being fixed to the bottom of said seat,

said retaining means including

a pair of substantially parallel, vertical telescoping rods connected to said base and accessible through said seat housed within the interior of said cylindrical telescoping sections,

means between said rods urging said rods away from each other, and

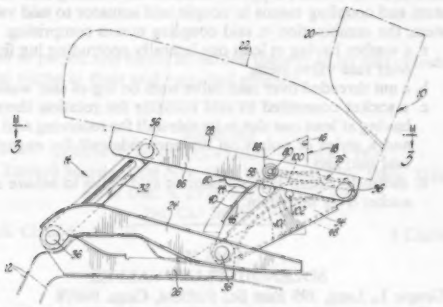
a plurality of vertically spaced lugs on each of said rods received within diametrically opposed slots in the sidewall of said telescoping cylindrical sections.

4,046,349

SUPPORT ASSEMBLY FOR FORWARDLY SHIFTABLE VEHICLE SEAT

James E. MacAfee, Grosse Isle, Mich., assignor to American Motors Corporation, Southfield, Mich.

Filed June 7, 1976, Ser. No. 693,613
Int. Cl.[2] B60M *1/08*
U.S. Cl. 248—424 **19 Claims**



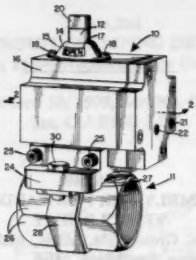
1. A vehicle seat support assembly for mounting a seat on a vehicle floor laterally adjacent a side door of the vehicle, the support assembly comprising: a lower frame for mounting on the vehicle floor; an upper frame for supporting the seat; front and rear links associated with inboard and outboard sides of the assembly and having opposite ends respectively pivoted to the upper and lower frames such that the upper frame is movable between a rearward seating position and a forward easy-enter position where the area rearward of the seat supported by the assembly is accessible to adjacent the door for entry into and exit from the vehicle; the frames each having an outboard rear extremity; the opposite ends of the rear link at the outboard side of the assembly being pivotally connected to the outboard rear extremities of the upper and lower frames such that a straight line therebetween with the upper frame in the easy-enter position extends upwardly and forwardly from the lower frame to the upper frame through open space adjacent the rear outboard portion of the assembly; the outboard rear link having an intermediate portion connecting the opposite ends thereof with a curved shape that is located downwardly and forwardly with respect to the straight line between the opposite ends thereof when the upper frame is positioned in the forward easy-enter position whereby the location of pivotal link connection to the outboard rear frame extremities increases the space between the door area and the rearward of the seat supported by the assembly and thus affords a passenger convenient access during entrance into or exit from the vehicle; and a latch mechanism for maintaining the upper frame in the rearward seating position and for selectively releasing the upper frame for movement to the forward easy-enter position.

4,046,350

POWER ACTUATED VALVE

Roger G. Massey, Exeter, and David G. Holloway, Concord, both of N.H., assignors to The Parker & Harper Manufacturing Company, Inc., Worcester, Mass.

Filed July 26, 1976, Ser. No. 708,698
Int. Cl.² F16K *31/16*
U.S. Cl. 251—58 **10 Claims**



1. In a power actuated valve comprising a valve operable from fully open to fully closed position by ninety degree rotation of a valve stem, a power actuator for rotating said valve stem and coupling means to couple said actuator to said valve stem, the combination in said coupling means comprising:

a. a washer having at least one laterally protruding lug fitted over said valve stem;

b. a nut threaded over said valve stem on top of said washer;

c. a socket connected to said actuator for rotation thereby having at least one slot in its sidewall for receiving said lug and a series of points on its inner sidewall for engaging said nut; and,

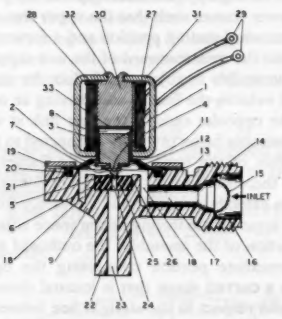
d. means to clamp said actuator to said valve to secure said socket over said stem.

4,046,351

SOLENOID FLUID VALVES

Gregor L. Lang, 295 East St., Suffield, Conn. 06078

Continuation of Ser. No. 215,052, Jan. 3, 1972, abandoned, which is a continuation-in-part of Ser. No. 830,342, June 4, 1969, Pat. No. 3,647,177. This application May 9, 1975, Ser. No. 576,167
Int. Cl.² F16K *31/06*; H01F *7/13*
U.S. Cl. 251—129 **11 Claims**



1. A solenoid fluid valve including in combination;

valve body means having a fluid duct therethrough, annular valve seat means intermediate said duct having a flow restricting passage therethrough forming a sealable fluid orifice; and

adjacent solenoid means having a ferrous core and a spring biased ferrous plunger armature extending within a coil, a ferrous structure exterior of said coil forming with said core and said armature a loop magnetic circuit, said armature arranged for operative motion axially coextensive of said core and having an outwardly extending portion adapted for sealing engagement with said orifice thereby defining the deenergized limit of motion of said armature;

the improvement thereof comprising,

a unitary housing for said armature including a tubular portion of substantially the same wall thickness throughout the tubular length thereof having one end closed by a transverse diaphragm portion and extending within said coil, said diaphragm substantially abutting an end of said core and defining the energized limit of motion of said armature; and

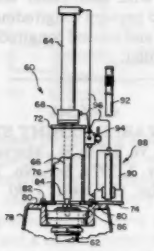
said ferrous structure comprising a unitary member formed from a strip of ferrous material of elongate rectangular plan and being in substantially gapless assembly with an end of said core thereby enabling a substantially closed loop magnetic circuit comprising only said three specified ferrous magnetic elements.

4,046,352

HYDRAULIC APPARATUS FOR RAISING AND LOWERING AN IMPELLER SHAFT

William J. Montagno, Rochester, and Allan L. MacIntyre, Lima, both of N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Oct. 14, 1976, Ser. No. 732,245
Int. Cl.² E21B *19/00*
U.S. Cl. 254—29 R **1 Claim**



1. A hydraulic apparatus for raising and lowering the shaft of an impeller apparatus comprising:

a. a hydraulic cylinder including a piston and a piston rod, said piston rod extending downward beyond one end of said cylinder;

b. support means including a top portion, a base portion and a hollow interior portion, said base portion including means for detachably securing said support means to the top of said impeller apparatus, said cylinder being secured to the top portion of said support means, and said piston rod extending downward into said hollow interior portion, and wherein said means for detachably securing said support means to the top of said impeller apparatus comprises a plurality of mounting holes in said base portion and a plurality of bolts adapted to threadingly engage the top of said impeller apparatus;

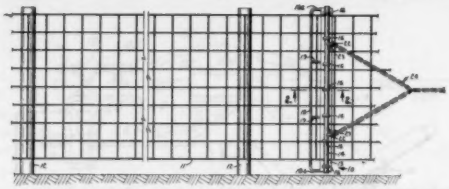
c. means for securing said piston rod to the end of said shaft, and

d. hydraulic circuit means in fluid communication with said hydraulic cylinder for activating said hydraulic cylinder to raise and lower said shaft, said hollow interior portion of said support means comprising means for receiving the end of said shaft when said shaft is in the raised position said hydraulic circuit means including a manual pump assembly having a lever actuator connected thereto, said pump assembly being affixed to the base portion of said support means.

4,046,353
FENCE WIRE STRETCHING DEVICE

Sylvester Buschmann, Maries Valley View, Vienna, Mo. 65582

Filed Oct. 26, 1976, Ser. No. 735,383
Int. Cl.² B66F 19/00
U.S. Cl. 254—83 8 Claims



1. In a device for use in stretching fence wire, the improvement comprising:

a base presenting a substantially flat surface for receiving the fence wire;

a plurality of spaced fingers projecting from said base, said fingers each having an end portion spaced outwardly of said flat surface and generally parallel thereto;

a substantially round bar member adapted for insertion between said base and the end portions of said fingers with the fence wire located between said bar member and base; and

means presenting a plurality of spaced grooves in said bar member extending in a generally circumferential direction therein and arranged eccentrically with respect to the longitudinal axis thereof, said grooves extending only partially around said bar member, said grooves being located to register with the respective fingers and being sized to closely receive same,

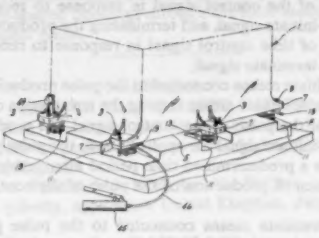
whereby rotation of said bar member effects camming action of said fingers within said grooves to press said bar member tightly against said base with the fence wire clamped therebetween.

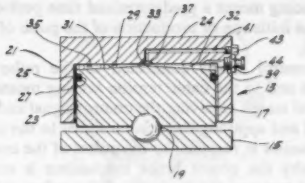
4,046,354
APPARATUS FOR POSITIONING AND SUPPORTING A MACHINE

Morris Randall Stith, Jr., R.R. No. 1, Box 13, Webster, Ky. 40176

Division of Ser. No. 607,921, Aug. 26, 1975, Pat. No. 3,978,574.
This application July 6, 1976, Ser. No. 702,440
Int. Cl.² B66F 3/24
U.S. Cl. 254—93 R 2 Claims

1. A jack comprising a cylinder and piston defining an expansible chamber having opposed cylinder and piston faces and being adapted to receive a pressurized, hardenable liquid, such as an epoxy resin mixed with a suitable hardener or catalyst, for relative extension of the cylinder and piston, said piston face protruding outwardly beyond the body of said piston with the outermost protruding portion of said piston face being at the center thereof, said cylinder face having a pocket therein in line with said outermost portion of said piston face, the latter being surrounded by a space for said liquid when said cylinder and piston faces are relatively retracted, said space constituting a portion of said chamber, said jack further having an inlet for the flow of said liquid to said space and an outlet extending from said pocket for exit of air from said chamber as said liquid enters said space, and means for closing said inlet and said outlet whereby with said cylinder and piston pressurized by said liquid and with said cylinder and piston in a selected relative extended position said closing means is operable to entrap said liquid within said chamber to hold said cylinder and piston at their said extended position



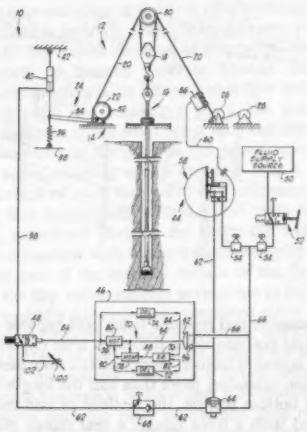


and to permit said liquid to harden thereby to fix said cylinder and piston in their said extended position.

4,046,355
DRAWWORKS CONTROL APPARATUS

T. Edward Martin, 3624 NW. 19th, Oklahoma City, Okla. 73107

Filed Dec. 8, 1975, Ser. No. 638,836
Int. Cl.² B66D 1/48
U.S. Cl. 254—173 R 5 Claims



1. In combination with a drawworks assembly having a work piece suspended from, and applying tension to, a cable, one end of the cable being wound on a drum, the rotation of which is controlled by a power brake mechanism, a control apparatus comprising:

a cable tension sensing means connected to the cable, the cable tension sensing means sensing the tension in the cable and producing a tension signal the level of which is proportional to the sensed cable tension;

pulse generating means for producing a pulsed control signal comprising:

pulse producing means for receiving a pulse-initiate signal and a pulse-terminate signal, initiating the production of a pulse of the control signal in response to receiving the pulse-initiate signal, and terminating the production of the pulse of thhe control signal in response to receiving the pulse-terminate signal;

pulse initiate means connected to the pulse producing means, the pulse initiate means sensing the termination of production of the pulse of the control signal and producing the pulse-initiate signal for application to the pulse producing means a predetermined time period after sensing the termination of production of the pulse of the control signal; and

pulse terminate means connected to the pulse producing means, the pulse terminate means sensing the initiation of production of the pulse of the control signal and producing the pulse-terminate signal for application to the pulse producing means a predetermined time period after sensing the initiation of production of the pulse of the control signal;

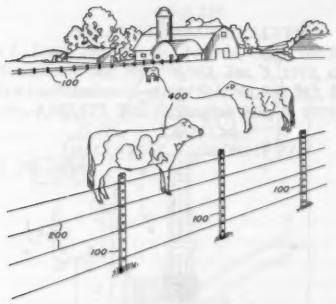
brake control means connected to the pulse generating means and to the cable tension sensing means, the brake control means receiving the control signal and the tension signal and applying the tension signal to the power brake mechanism in response to the pulses of the control signal, whereby the power brake mechanism is actuated in a pulsed manner, the strength of the pulses being proportional to the tension in the cable.

4,046,356

PLASTIC FENCE POSTS AND ENCLOSURES

Byron W. Rose, Circleville Township, Pickaway County, Ohio, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Oct. 17, 1975, Ser. No. 623,299
Int. Cl.[2] A01K *3/00*
U.S. Cl. 256—10 **13 Claims**



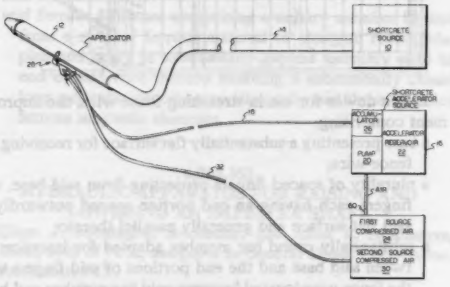
1. A releasable and reusable fence post capable of returning to an upright position when deflected after implantation comprising an injection molded thermoplastic resin member having a top section extending more than half the length of the member, and a bottom section, the sections of said member being constructed with a front flange, a rear flange parallel to the front flange, a web intersecting the flanges, and a plurality of wire engaging members projecting forwardly from the front flange, the intersecting web extending laterally from the front flange to a short distance beyond the rear flange, the vertical extent and thickness of said web being greater than said flanges and the width of said front flange being greater than said rear flange, the bottom of said web being a point, at least one of said flanges includes an outwardly extending support plate in the bottom section of the member, said integral support plate having a rectangular section and an adjacent trapezoidal section converging towards the nearer end of said flange, the cross-sectional area of said integral support plate being sufficient to support said member in an upright position.

4,046,357

SHOTCRETE ACCELERATOR INJECTION APPARATUS AND METHOD

F. Shawn Twitchell, Salt Lake City, Utah, assignor to Construction Systems & Equipment, Inc., Salt Lake City, Utah

Filed Dec. 3, 1976, Ser. No. 747,387
Int. Cl.[2] B28C *1/02, 5/46*
U.S. Cl. 259—147 **12 Claims**



1. A method of injecting shotcrete accelerator into a flowing shotcrete slurry prior to application thereof by and through a shotcrete applicator connected to receive said shotcrete slurry under pressure, said method being comprised of:

supplying shotcrete accelerator to said applicator at a pressure in excess of the pressure of said shotcrete slurry as it passes through said applicator;

supplying compressed air to said applicator at a pressure in excess of the pressure of said shotcrete slurry as it passes through said applicator;

intermixing said shotcrete accelerator and said compressed air together in the vicinity of said applicator; and

injecting the mixture of said accelerator and said compressed air into the shotcrete slurry in said applicator to intermix therewith as said shotcrete passes through said applicator.

8. Apparatus for applying shotcrete comprised of:

a source of shotcrete under pressure;

a source of shotcrete accelerator;

first and second sources of compised air;

an air driven positive displacement pump connected to said first source of compressed air to be driven thereby and positioned and connected to take a suction from said source of shotcrete accelerator and to supply shotcrete accelerator under pressure at its output;

an accumulator having an inlet and an outlet, said inlet being connected to receive the output of said pump;

a shortcrete applicator connected to the source of shotcrete to receive shotcrete under pressure therefrom;

an accelerator injection manifold positioned along the length of said applicator, said manifold having:

a first inlet connected to the outlet of said accumulator to receive shotcrete accelerator therefrom,

a second inlet connected to said second source of compressed air to receive compressed air therefrom,

a body in which said compressed air and said shotcrete accelerator are intermixed, and

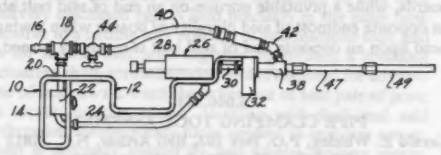
a plurality of outlets connected to said applicator to inject the mixture of compressed air and shotcrete accelerator into the shotcrete in said applicator.

4,046,358

METHOD AND APPARATUS FOR MIXING AND DISPENSING MATERIAL

Charles Grimes, Decatur, Ga., assignor to National Service Industries, Inc., Atlanta, Ga.

Filed May 10, 1976, Ser. No. 685,086
Int. Cl.² B28C 5/06
U.S. Cl. 259—147 15 Claims



1. Apparatus for mixing and dispensing two or more chemical compounds comprising:

a gun frame having means thereon for receiving two or more separate chemical components and for mixing same together,

means on said frame for delivering said components under pressure,

a mixing chamber on said frame into which said mixed components are discharged from said means for mixing, said mixing chamber having an inlet end and an outlet end,

means on said frame comprising air under pressure in communication with and introduced into said mixing chamber forwardly of the discharge of said mixed components from said means for mixing same for producing a suction in the inlet end of said mixing chamber and pressure in the outlet end,

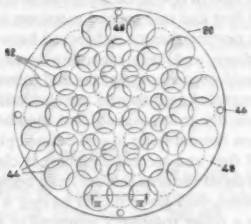
and a discharge barrel on said gun frame in communication with said mixing chamber and into which said mixed components are forced by air to exit from said barrel.

4,046,359

INJECTION MOLDING FILTER ASSEMBLY

Jobst Ulrich Gellert, 11 Newton Road, Brampton, Ontario, Canada

Filed May 17, 1976, Ser. No. 687,258
Claims priority, application Canada, Mar. 24, 1976, 248735
Int. Cl.² B01D 35/28
U.S. Cl. 259—193 3 Claims



1. An injection molding filter assembly to be located in a passage between a molding machine and a mold to filter pressurized melt flowing therethrough comprising:

a. a first upstream plate having a plurality of circular openings extending therethrough and a flat downstream face;

b. a second downstream plate having a plurality of circular openings extending therethrough and a flat upstream face, the first and second plates being located transversely in said passage with the flat upstream face of the second plate abutting in an abutment plane on the flat downstream face of the first plate, and

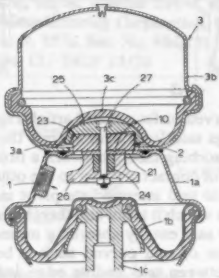
c. means to secure the first and second plates against relative rotation therebetween; the circular openings in the first and second plates being arranged in concentric circles with the openings of each circle being of equal size with each of the openings in each plate partially overlapping at least two openings in the other plate to provide a plurality of eye-shaped openings through the filter assembly in the abutment plane.

4,046,360

RUBBER FLAP DAMPER VALVES

Anthony Best, Westbury, and Harold Harman, Bradford-on-Avon, both of England, assignors to Moulton Developments Limited, England

Filed July 9, 1976, Ser. No. 703,944
Claims priority, application United Kingdom, July 11, 1975, 29263/75
Int. Cl.² F16F 5/00
U.S. Cl. 267—65 B 7 Claims



1. A flap type damper valve for use in controlling liquid flow in a hydraulic suspension unit, comprising: an apertured port plate having a plurality of bump ports and a plurality of rebound ports therethrough, each of said ports having a predetermined maximum diameter; a pair of elastomeric flap valves secured on opposite sides of the port plate with one of the flap valves disposed in overlying relation to the bump ports and the other of said flap valves disposed in overlying relation to the rebound ports, to thereby obturate flow in one direction through the respective ports and to enable flow in the opposite direction through the respective ports, the predetermined maximum diameter of the ports being such that the flap valves are not extruded into the ports at the pressures encountered; rigid flap valve retaining means engaged with a part of the external surface of each flap valve and precompressing each flap valve into engagement with the port plate to cover the respective, associated ports in the plate, the rigid retaining means in conjunction with the port plate engaging and confining a major part of the external surface of the flap valves so that when the flap valves deform in response to liquid pressure to at least partially uncover their associated ports, such deformation takes place primarily in compression; and the port plate contacting surface of said flap valves being irregularly shaped to provide a multiplicity of contact points with the plate, whereby some lamination of flow past the contact surfaces of the flap valves with the plate is obtained, thus reducing the tendency of the flap valves to vibrate during operation.

4,046,361

IMPACT ENERGY ABSORPTION DEVICE

Robert L. Morse, Crossett, Ark., assignor to Mechanisms, Inc., Crossett, Ark.

Filed July 28, 1975, Ser. No. 599,782
Int. Cl.² F16F 7/10
U.S. Cl. 267—139 7 Claims

1. Device for cushioning the impact of a first article against a second article when said articles approach each other along a predetermined straight path, said first article having a sub-

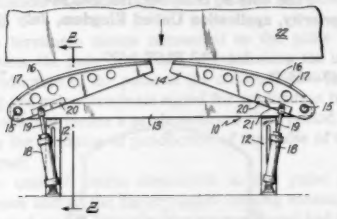
stantially straight leading edge substantially perpendicular to said path, and said device comprising:

a lever arm having a curved surface,

energy absorbing means,

pivot means intermediate the ends of said lever arm connecting said lever arm to said energy absorbing means,

means for pivotally connecting a first end of said lever arm to said second article with the lever arm extending transversely across said path and said curved surface facing said first article so that said leading edge contacts a point



on said curved surface as said articles approach each other and swings said lever arm against the resistance of said energy absorbing means between a first position in which said point of contact is closer to the other end of said lever arm than to said intermediate pivot means and a second position in which it is not and thereby causes absorption of energy by said energy absorbing means,

the curvature of said curved surface being such that the contact between said leading edge and curved surface is essentially a rolling contact as said lever arm moves from said first position to said second position.

4,046,362

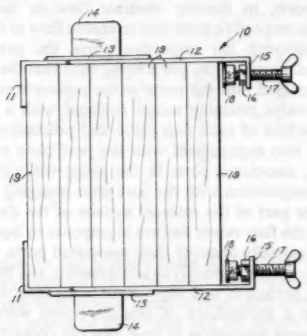
BOARD HOLDING DEVICE

Milton L. Spillers, 310 S. River St., Newberg, Oreg. 97132

Filed July 6, 1976, Ser. No. 702,706

Int. Cl.² B25B 1/20

U.S. Cl. 269—43 1 Claim



1. A board holding device, comprising in combination, a pair of clamp units secured around opposite ends of a plurality of same-length boards stacked in a row with flat sides thereof abutting each other; each of said clamp units being comprised of an angle iron having a pair of legs at right angles to each other, an L-shaped plate comprised of a wide panel and a narrow panel at right angles to each other, and end edge of said plate wide panel abutting an end edge of one of said angle iron legs and being secured thereto, one flat side of said plate wide panel and one flat side of said angle iron leg abutting said board ends, an overlapping plate having one flat side abutting an opposite flat side of said L-shaped plate wide panel and an opposite flat side of said angle iron leg and being welded thereto, said overlapping plate bridging said welded, abutting end edges of said plate wide panel and said angle iron leg, an opposite side of said overlapping plate having a U-shaped handle grip welded thereto; said narrow panel of said L-shaped plate having a nut fastener welded thereto, an opening of said nut fastener being aligned with an opening through said narrow panel, a bolt extending through said narrow panel opening being threadingly engaged in said nut fastener, the other of said angle iron legs abutting with one endmost of said plurality of boards, while a pivotable portion on an end of said bolt abuts an opposite endmost of said plurality of boards when a winged head upon an opposite end of said bolt is manually turned.

4,046,363

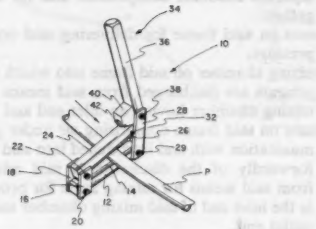
PIPE CLAMPING TOOL ASSEMBLY

Gerald E. Whitley, P.O. Box 103, Bell Arthur, N.C. 27811

Filed Dec. 31, 1975, Ser. No. 645,840

Int. Cl.² B25B 1/14

U.S. Cl. 269—228 4 Claims



1. A pipe clamping tool assembly for clamping and effectively closing a pipe or the like, comprising: a generally elongated first member having an arcuate shaped upper pipe receiving surface for receiving a portion of a pipe to be clamped; first and second arm means secured to opposite portions of said first member and extending therefrom; a generally elongated second member having an arcuate shaped lower pipe engaging surface formed thereon and movably mounted to said first arm means and movable back and forth between a first pipe loading position where a pipe or a portion thereof can be easily placed adjacent the upper engaging surface of said first member and a second pipe clamping position generally overlying said first member such that in operation a pipe receiving area is defined between said first and said second members and the pipe to be clamped or a portion thereof is disposed between said first and second members; and pipe clamping lever means movably mounted to said second arm means and movable with respect thereto for engaging said second member and for pressing the same downwardly towards said first member such that said pipe or portion thereof lying in said defined pipe receiving area between said first and second members is clamped and effectively closed about the area thereof lying between said first and second members, said lever means having a pressing portion that includes a roller rotatively mounted in association therewith so as to engage a portion of said second member during the clamping operation and to press thereagainst as said lever means is actuated by pivoting the same towards said second member.

4,046,364

TORQUE LIMITING VISE FOR HOLDING WORK ON A MACHINE TOOL TABLE

Robert L. Coope, and Lowell W. Munson, both of Phoenix, Ariz., assignors to Stevens Engineering, Phoenix, Ariz.

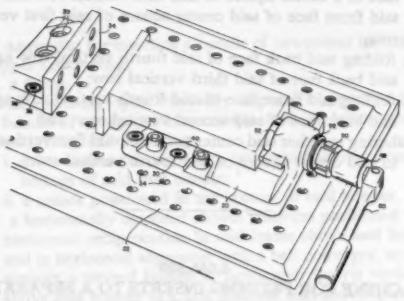
Filed Oct. 1, 1976, Ser. No. 728,751

Int. Cl.² B25B 1/10

U.S. Cl. 269—244 4 Claims

1. A torque limiting vise for holding work on a machine tool

table; means for fixing said vise on a machine tool table; said vise having a pair of holding jaws between which a part may be clamped and held during the performance of machine work thereon; means for forcing said jaws together with a predetermined amount of force which predetermines a precise degree of mechanical deflection of either or both of said jaws in response to pressure thereof against a part clamped between said jaws, whereby successively machined parts, held by said jaws, create precisely the same amount of deflection so that each successively machined part is held precisely in the same position relative to a cutting tool position of said machine tool; said means for forcing said jaws together comprising a rotatable jaw actuating shaft; screwthreaded means disposed for advancing one of said jaws toward the other one of said pair of jaws; and a torque limiting means coupling said shaft and said screwthreaded means; rotary force applied to said jaw actuating shaft is precisely limited by said torque limiting means, thereby precisely limiting force of said screwthreaded means



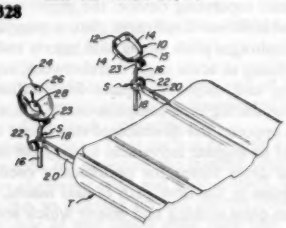
applied to said one of said jaws; said torque limiting means being a slippable clutch; said slippable clutch provided with a plurality of first discs coupled to said actuating shaft; said clutch having a plurality of second discs coupled to said screwthreaded means; said first and second discs disposed alternately between each other and in contigous relationship; said actuating shaft and said screwthreaded means being on a common axis; and said discs being free to move into pressure contact with each other in a direction longitudinally of said common axis; and adjustable resilient means adjustable to apply force in a direction longitudinally along said common axis and against said first and second discs to thereby cause frictional engagement therebetween and to provide for the adjustment of a predetermined amount of torque transmitting force between said actuating shaft and said screwthreaded means before said first and second discs slip relative to each other while said actuating shaft is being rotated to force one of said jaws toward said other one of said jaws.

4,046,365

STIRRUP GUARD FOR MEDICAL EXAMINATIONS

Shirley A. Dungan, 3370 W. Aksarben, Littleton, Colo. 80123

Filed June 28, 1976, Ser. No. 700,405
Int. Cl.² A61G 13/00
U.S. Cl. 269—328 **9 Claims**



1. In a foot support adaptable for use in medical examinations and the like wherein an examining table is provided with stirrups at one end of the table to support the patient's feet, each stirrup being characterized by having an outer surrounding, substantially rigid frame and inner hollow portion, the combination therewith comprising:

a protective pad defined by a normally flat body composed of a resilient material provided with a central opening therein, said body dimensioned to overlie and extend beyond the outer frame member, and

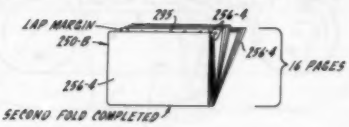
releasable fastener means at spaced intervals on said body adapted to releasably attach said pad in overlying relation to a stirrup with the central opening aligned with the inner hollow portion of said stirrup.

4,046,366

METHOD FOR PRODUCING BOOKS

William B. McCain, Hinsdale; James F. Cosgrove, Western Springs, and Arthur E. Eaves, Morton Grove, all of Ill., assignors to McCain Manufacturing Corporation, Chicago, Ill.

Filed June 9, 1976, Ser. No. 694,221
Int. Cl.² B41F 13/56
U.S. Cl. 270—21 **3 Claims**



1. A method of making a book comprising:

a. juxtaposing webs of printed material and registering the webs in pre-paged relationship by register means located along one edge of the webs;

b. cutting the juxtaposed webs to produce juxtaposed sheets to be folded;

c. folding the juxtaposed sheets once along a first fold parallel to said one edge to dispose the register means at an extended lap margin;

d. folding the once-folded sheets along a second fold parallel to the first to locate the first fold adjacent the lap margin, thereby providing a group of signatures having a backbone afforded by the second fold;

e. stitching said backbone to join the signatures; and

f. separating the extended lap margin along a trim line which includes the fold line of the first fold, thereby to open the pages of the book.

4,046,367

MODIFIED HIGH SPEED PAPER INSERTING APPARATUS AND METHOD

George Merker, Fair Lawn; Menashe Navi, Lebanon, both of N.J., and Joseph Krupp, Bangor, Pa., assignors to American Newspaper Publishers Association, Incorporated, Easton, Pa.

Filed Nov. 10, 1975, Ser. No. 630,223
Int. Cl.² B65H 5/30
U.S. Cl. 270—55 **10 Claims**

1. A method of high speed in-line inserting of a supplement insert into a newspaper which is being rectilinearly conveyed in a forward direction, and comprising the steps of:

A. folding a newspaper to provide an extending lap on a first half of said folded newspaper with respect to a second half, conveying said folded newspaper as a folded jacket with the folded edge forwardly disposed to a speed up station, and

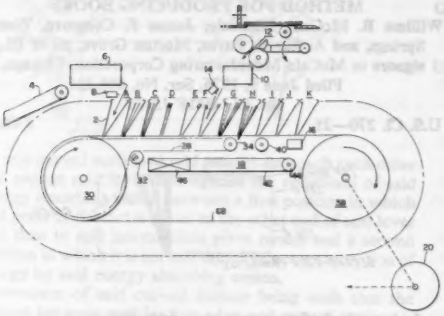
B. accelerating said folded jacket edge downwardly onto a horizontal plane for a first horizontal conveyance and for a rectilinear series of steps wherein said folded edge is rectilinearly conveyed in the plane of said first horizontal conveyance while maintained downwardly with respect to said extended lap, wherein the first half of said folded jacket is disposed in a leading direction with respect to the

forward direction of conveying, said rectilinear conveying steps further comprising in sequence:

i. supporting and conveying said folded edge in a forward direction as a rectilinear conveyance, while maintaining said extending lap in a first position inclined and upwardly disposed relative to said rectilinearly conveyed folded edge; and while so conveying said folded edge, further

ii. pivoting said extending lap in the trailing direction, relative to said direction of conveyance of said rectilinearly conveyed folded edge, to a second inclined position, and

iii. maintaining said second half of said folded newspaper at said second position, and



iv. forwardly pivoting only said first half of said folded newspaper towards said first position to thereby define an upwardly opening pocket between said second and first halves of said newspaper, and

C. impelling at least one insert downwardly into said upwardly opening pocket to thereby define a composite newspaper; and,

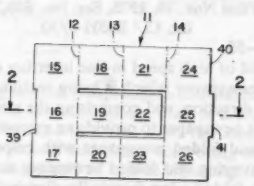
D. further rectilinearly conveying the folded edge of said composite newspaper to a downwardly directed discharge station, accelerating said composite newspaper downwardly, with respect to the plane of said first horizontal conveyance, to a second horizontal rectilinear conveyance which is below the plane of said first rectilinear conveyance and opposite in direction with respect to the direction of said first conveying.

4,046,368

FOUR PAGE BOOKLET

Jack G. LeBreton, 83 DeNesbbi Drive, Streetsville, Canada

Filed Aug. 21, 1975, Ser. No. 606,577
Int. Cl.² B65H *45/00*
U.S. Cl. 270—61 R **1 Claim**



1. A four page booklet formed from the following steps, which comprises:

a. forming first second and third vertical fold lines in a rectangularly shaped planar member having a front face and back face.

b. subdividing each said front and said back faces of said rectangularly shaped member into twelve equal squares arranged in four vertical rows and three horizontal rows; said four vertical rows being arranged as first, second, third, and fourth rows respectively, partitioned by said first, second, and third fold lines and positioned consecutively from one vertical edge of said member to an opposite vertical edged thereof; said horizontal rows being arranged in a top, a center, and a bottom row; p1 c. cutting along a center portion of said third vertical fold line between center squares of said third vertical row and said fourth vertical row;

d. cutting along a horizontal line between said top and center squares of a second and third vertical row;

e. cutting along a horizontal line between said center squares and bottom squares of said second and said third vertical rows wherein steps c, d and e form a flap hinged along said first vertical fold line;

f. folding said flap of said center squares against the back face of a center square of said first vertical row and over said front face of said center square of said first vertical row;

g. folding said back face of said fourth vertical row against said back face of said third vertical row;

h. folding said front face of said fourth vertical row against said back face of said second vertical row; and

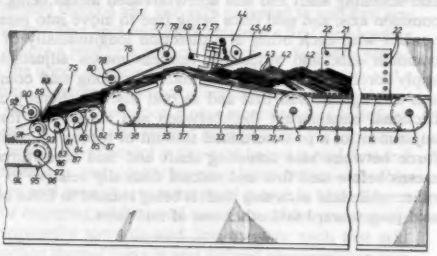
adhering together said center square of said first vertical row to said center square of said fourth vertical row.

4,046,369

MACHINE FOR FEEDING INSERTS TO A SEPARATING DEVICE

Willi Kluge, and Reinhard Kluge, both of Kugelberg 55, 6300 Giessen, Germany

Filed May 5, 1976, Ser. No. 683,386
Int. Cl.² B65H *1/22, 1/30, 3/04, 3/06*
U.S. Cl. 271—3.1 **19 Claims**



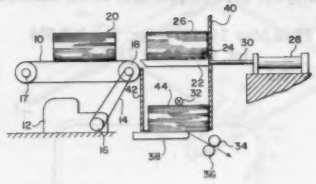
1. In a machine for feeding overlapped inserts to a separating device for separating the inserts, said machine having conveyor means which carries said overlapped inserts and moves same to said separating device, the improvement comprising wherein at least one diaphragm plate is provided, a front side of said diaphragm plate facing said inserts and said conveyor means defining an acute angle therebetween, support means for supporting said diaphragm plate for oscillatory movement comprising, during each complete oscillation, a movement in a direction opposite the direction of movement of the conveyor means and an angular movement to vary the size of said acute angle and drive means for periodically oscillating said diaphragm plate in the flow path of said inserts, said oscillating diaphragm plate striking said inserts which accumulate at said front side thereof in a direction opposite to said direction of movement of said conveyor means, said striking of said inserts effecting a shifting between and an accurate control of the space between the leading edges of said inserts.

4,046,370

METHOD AND APPARATUS FOR INSERTING A BUNDLE OF NEWSPAPER INSERTS INTO A HOPPER

Menashe Navi, Lebanon, N.J., assignor to ANPA Research Institute, Easton, Pa.

Continuation of Ser. No. 599,227, July 25, 1975. This application Feb. 25, 1977, Ser. No. 772,174
Int. Cl.[2] B65H 5/22
U.S. Cl. 271—3.1 5 Claims



1. Apparatus for inserting a bundle of newspaper inserts into a hopper comprising:

A. a frame;

B. an upwardly open, vertically disposed hopper for a first bundle of newspaper inserts supported at a lower point in said frame and including:

i. drive means for removing individual inserts from the bottom of said first bundle;

ii. a sensor positioned in the bottom of said hopper,

C. a horizontally disposed shovel platform positioned for a horizontal reciprocation in said frame above said hopper and in horizontal alignment with a belt conveyor, so as to support a second bundle of newspaper inserts vertically above said hopper in a first position; said shovel platform having a plurality of vertical heads extending vertically from the top surface of said platform, said shovel platform being horizontally reciprocable to a second platform position outside of said hopper to thereby drop said second bundle, as said sensor within said hopper senses a critical low number of inserts remaining in said first bundle in said hopper;

D. bundle vertical guide means supported in said frame above said hopper and adjacent and extending above said shovel platform top surface, so as to retain said second bundle for dropping downwardly into said hopper during a horizontal reciprocation of said shovel platform to said second position;

E. means responsive to said sensor for horizontally reciprocating said platform with respect to said hopper; and

F. said endless belt conveyor supported adjacent said platform, so as to advance a replenishment bundle of newspaper inserts onto said shovel platform as said shovel platform is reciprocated back to said first position above said hopper.

4,046,371

DOCUMENT STACKING DEVICE

Nitin M. Sevak, Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

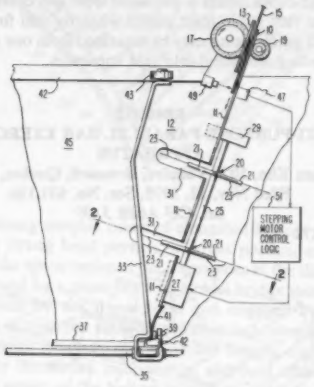
Filed Nov. 11, 1975, Ser. No. 630,914
Int. Cl.[2] B65H 29/40
U.S. Cl. 271—178 2 Claims

2. A device for deflecting the trailing end of a document onto a stack as documents are serially transported on edge into the proximity of the stack, comprising:

a guiding plate having a front surface defining a portion of a transport path for directing the leading edge of a document into alignment with and onto a stack, said guiding plate having an opening formed therein communicating the back side of said guide plate with said front guide surface thereof;

deflecting means defining a paddle wheel having at least one paddle arm, rotatably disposed about an axis of rotation lying to said back side of said guide plate and subjacent thereto for carrying said paddle arm uniformly in one direction through said opening toward the stack;

control means responsive to a document passing a predetermined point en route to the stack for incrementally rotating said deflecting means in timed relation with the moving document for deflecting the trailing end of the document onto the stack, whereby the document is carried off the guide plate to clear the path of a subsequently transported document; and



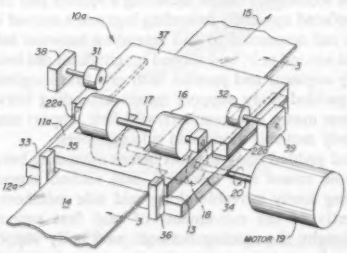
spring means secured to the outer end of said paddles arm and cooperable therewith to deflect the documents onto the stack and for applying pressure to the last stacked document holding the same against the stack after the stacking of said last stacked document is completed, said spring means being so constructed for keeping the path of document travel along the guide plate unobstructed between stacking.

4,046,372

PHOTOTYPESETTER FILM FEED DEVICE

Peter R. Ebner, Nashua, NH, assignor to Itek Corporation, Lexington, Mass.

Filed Aug. 4, 1976, Ser. No. 711,657
Int. Cl.[2] B65H 29/20
U.S. Cl. 271—273 7 Claims



1. Sheet feeding apparatus comprising:

a. first and second guide means for defining a passageway therebetween through which a sheet is to be fed, said first and second guide means including first and second roller means, respectively, between which said sheet is to be passed for driving said sheet through said passageway, said first guide means comprising first guide plate means having an outer surface; and,

b. means for releasably securing said first and second guide means, said releasable securing means including:

1. hold-down means for pressing against said outer surface of said first guide plate means to press said first guide plate means toward said second guide means; and,

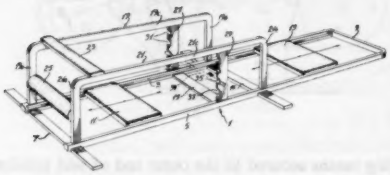
2. means for supporting said first guide plate means for lateral movement between a first position wherein said hold-down means is pressing against said outer surface of said first guide plate means for pressing said first guide plate means toward said second guide means for operation, and a second release position wherein said hold-down means is displaced from said outer surface of said first guide plate means whereby said first and second guide means may be separated from one another for loading said sheet into said apparatus.

4,046,373

MULTI-PURPOSE PARALLEL BAR EXERCISING APPARATUS

Chong Chan Kim, 1070 Voltaire, Brossard, Quebec, Canada

Filed Nov. 12, 1975, Ser. No. 631,116
Int. Cl.² A63B *3/00*
U.S. Cl. 272—63 **7 Claims**



7. An exercise apparatus comprising:

guide frame means, said frame means including a pair of elongated side members, said side members being oriented substantially parallel to one another and being interconnected at their opposite ends by end members, said end members being substantially parallel and cooperating with said side members to define an elongated enclosed area;

first rail means mounted on one of said frame means side members and extending longitudinally therealong, said first rail means including a first pair of spatially displaced upwardly extending legs and a first longitudinal rail connected to and extending between said legs of said first pair, said first longitudinal rail being displaced above said frame means one side member;

second rail means mounted on the other of said frame means side members and extending longitudinally therealong, said second rail means including a second pair of spatially displaced upwardly extending legs and a second longitudinal rail connected to and extending between said legs of said second pair, said second longitudinal rail being generally coplanar and parallel with said first longitudinal rail;

first padded body support means extending between said frame means side members, said first support means being freely movable along said side members;

second padded body support means extending between said frame means side members, said second support means being freely movable along said side members independently of the movements of said first support means whereby the spacing between said body support means may be varied;

first vertical rod support means extending between one of said frame means side members and said first rail means longitudinal rail, said first vertical rod support means including a plurality of spatially displaced notches;

second vertical rod support means extending between the other of said frame means side members and said second rail means longitudinal rail, said second vertical support means including a plurality of spatially displaced notches, the notches of said second vertical rod support means being horizontally aligned with the notches of said first vertical rod support means; and

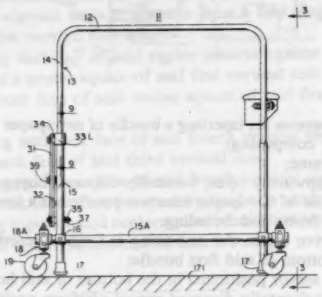
rod means adapted to be received by corresponding notches in said first and second vertical support means whereby the height at which said rod means is disposed is adjustable.

4,046,374

WALKING AID

Thomas E. Breyley, 3717 Hopper Hill Road, Cincinnati, Ohio 45230

Filed May 14, 1973, Ser. No. 360,084
Int. Cl.² A63B *23/04*
U.S. Cl. 272—70.3 **5 Claims**



4. A walker which comprises a pair of side frames, means interconnecting the side frames to form an enclosure, each of the side frames including a pair of upright legs, a hand grip bar connecting upper end portions of the legs, there being an open space between the hand grip bars for a patient with hands on the hand grip bars and feet supported on a supporting surface, an elongated caster support frame linking the upright legs spaced below the hand grip bar and caster supports attached to opposite end portions of the caster support frame, the caster support frames being outboard of the vertical members and extending forwardly and rearwardly beyond the vertical members, the caster supports being mounted on the caster support frames forwardly and rearwardly of the vertical members, a caster mounted on each caster support, and a spring mounted in each caster support supported by the associated caster and urging the associated end portion of the caster support frame to a raised position in which the lower ends of the associated legs are spaced above the supporting surface on which the casters run, the springs yielding when weight is applied to the bars to permit the lower ends of the legs to engage the supporting surface, the legs engaging the supporting surface to prevent advance of the device when the support frame is in a lowered position.

4,046,375

ROTATABLE SWING

Marion Pasteur Lelong, 1308 Seaton Lane, Falls Church, Va. 22046

Continuation-in-part of Ser. No. 160,727, July 8, 1971, Pat. No. 3,829,086. This application Dec. 21, 1973, Ser. No. 427,059
The portion of the term of this patent subsequent to Aug. 31, 1991, has been disclaimed.
Int. Cl.² A63G *9/00*
U.S. Cl. 272—85 **24 Claims**

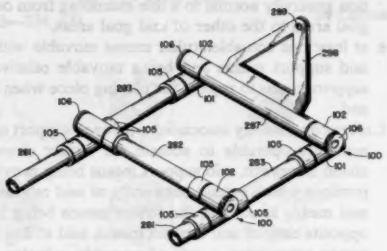
24. A swing for two riders in generally facing relationship, comprising:

A. at least one aligner shaft; and

B. a pair of assemblies, each adapted to support a person thereon, which:

1. are disposed on opposite ends of and spaced apart in approximate alignment with said at least one aligner shaft,

2. are independently rotatable with respect to each other and to said at least one aligner shaft,
3. are interconnected by and rotatably attached to said at least one aligner shaft, and



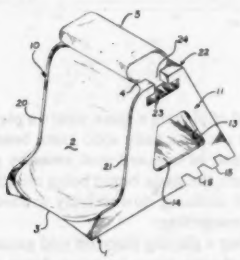
4. each comprise a stabilizer means for limiting revolution of a person on said assembly about an axis substantially parallel to said at least one aligner shaft to less than an upside-down position when said swing is operably suspended from a pair of opposed support pivots.

4,046,376

BOWLING PRACTICE DEVICE

Leslie E. Harvey, 255 S. Rengstorff Ave., Mountain View, Calif. 94040, and Stephan D. Spiva, 670-C Danforth Drive, Sunnyvale, Calif. 94087

Filed June 23, 1976, Ser. No. 698,952
Int. Cl.² A63D *5/00*
U.S. Cl. 273—54 D **8 Claims**



1. A bowling practice device comprising:

means forming an inclined ramp for receiving a rolling bowling ball delivered by a bowler, said ramp having a lower forward edge, a pair of spaced side edges and an upper edge and a generally upwardly sloping inclined surface extending from said lower forward edge to said upper edge, the lower half of said inclined surface being generally concave in that it is curved symmetrically upwardly from its midpoint toward each of said side edges along substantially its entire length and curved upwardly from said lower forward edge toward said upper edge with respect to at least the lower half thereof for centering a ball striking the device between said side edges; and

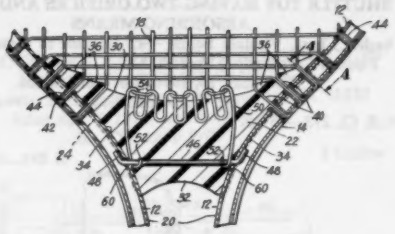
means forming a pad at said upper edge of said inclined surface for stopping the forward motion of said ball, and causing said ball to roll in a reverse direction down said ramp toward said bowler.

4,046,377

TENNIS RACQUET

Joseph N. Khazzam, Baldwin, N.Y., assignor to Regent Sports Corporation, Hauppauge, N.Y.

Filed Feb. 14, 1974, Ser. No. 442,369
Int. Cl.² A63B *49/02*
U.S. Cl. 273—73 G **3 Claims**



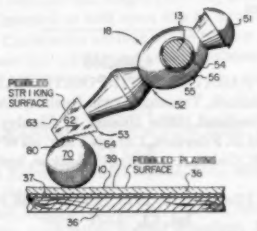
1. A strung racquet frame of elongated hollow tubing comprising a strung head portion, a throat portion, and a handle portion, the space between the frame sides at the throat portion being closed by a generally trapezoidal bridge member which is embraced by the frame sides and engaged by the frame stringing, a cross-bar embedded within and extending laterally of the bridge member, said cross-bar having arms extending outwardly therefrom, into, within, and only upwardly along the inner aspect of the hollow tubing, the bridge member and the interengagement of the cross-bar component thereof with the frame throat restraining the frame sides against lateral movements towards and away from each other, the bridge member and cross-bar being otherwise unsecured to the frame, and the stringing through the frame and the bridge member uring the bridge member upwardly and the embedded cross-bar and arms into more positive engagement with the frame sides.

4,046,378

TABLE SOCCER PLAYING FIGURE

Robert L. Furr, Dallas, Tex., assignor to Robert I. Hayes, Jr., Dallas, Tex., a part interest

Filed Apr. 12, 1976, Ser. No. 675,786
Int. Cl.² A63F *7/10*
U.S. Cl. 273—85 D **10 Claims**



6. An improved playing figure for a table soccer game structure of the type having a plurality of game figures mounted to rotationally and axially movable actuating rods and said playing figures each having a foot portion thereof depending from its associated rod adjacent a playing field portion and adapted to contact a ball thereon, each of said playing figure foot portions including flat side surfaces lying in a generally vertical plane and generally flat front and rear surfaces lying in different planes positioned at an angle with respect to the longitudinal axis of the figure with the thickness of said foot portion being less at the bottom thereof than at the top, wherein said improvement comprises:

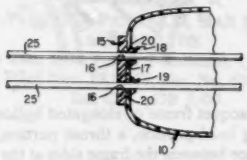
a control corner positioned along a bottom edge of a foot portion and lying in a plane generally parallel to the longitudinal and transverse axes of said playing figure to increase the degree of control said foot portion has over a playing ball while manipulating said ball.

4,046,379

SHUTTLE TOY HAVING TWO ORIFICES AND SHOCK ABSORBING MEANS

Ascher Chase, Virginia Beach, Va., assignor to General Foam Plastics Corporation, Norfolk, Va.

Filed Mar. 19, 1976, Ser. No. 668,614
Int. Cl.[2] A63H *33/00*
U.S. Cl. 273—95 AA **4 Claims**



1. A stabilized action mechanism comprising
a. first and second flexible track means each having free end portions;
b. a slide body means having forward and aft ends;
c. first and second orifices formed along a horizontal axis of said slide body means in said forward and aft ends;
d. said flexible track means being threaded respectively and independently through said first and second orifices;
e. an independent handle means associated with each of the free end portions of said track means,
f. an anchoring means fastening each of said free ends to said handle means; and
g. said handle means being in the form of a generally closed loop and including an integrally formed shock absorbing bellows means through which end portions of said track means adjacent said anchoring means are passed;
h. whereby said slide body means is adapted to be propelled along said track means in a substantially straight line course and in a stabilized attitude when a first pair of end portions of said track means is maintained in a substantial side-by-side relationship while the opposite pair of end portions is subjected to rapidly applied divergent tensioning forces.

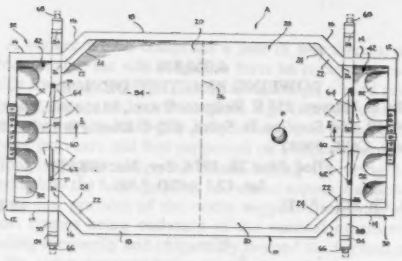
4,046,380

GAME APPARATUS WITH POSITIONAL STRIKERS

Adolph E. Goldfarb, Tarzana; Erwin Benkoe, Encino; Delmar K. Everitt, Woodland Hills; Ronald F. Chesley, La Crescenta, and Richard D. Frierdich, Canoga Park, all of Calif., assignors to Adolph E. Goldfarb and Erwin Benkoe, both of Northridge, Calif.

Filed Dec. 8, 1975, Ser. No. 638,550
Int. Cl.[2] A63F *7/00*
U.S. Cl. 273—119 R **17 Claims**

1. A game apparatus where a pair of opposed players attempt to propel a spherical playing piece toward and into a goal area at the opposite end of a playing surface, said apparatus comprising:
a. a game board defining a substantially solid playing surface having a goal area at each of a pair of opposed ends thereof,
b. said playing surface having a high section intermediate each of said goal areas and inclining downwardly from said high section toward each of said goal areas so that the spherical playing piece will always roll down one of said inclines toward one or the other of said goal areas,
c. rebound means surrounding said playing surface except at said goal areas to retain and repel a playing piece used on said playing surface,
d. a pair of support means disposed on said playing surface, each support means being located in relation to one of said goal areas being manually transversely shiftable in a direction generally normal to a line extending from one of said goal areas to the other of said goal areas,
e. at least one actuable striker means movable with each of said support means and being movable relative to said support means to engage the playing piece when actuated, and
f. means operatively associated with each support means and manually operable to actuate the striker element associated therewith, said support means being provided with portions which extend outwardly of said rebound means, said means to actuate the striker means being located at opposite ends of said support means, said striker actuating means comprising a pair of movable actuator members which each extend outwardly of one of the extended portions of the support means and are movable inwardly to actuate the striker means so that the user can grasp said extended portions with his hands and effect transverse movement of the support means while concurrently using the fingers of his hands to move the actuator members inwardly so as to actuate the striker means.

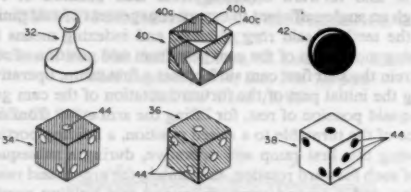


9. A method of playing a game where a playing piece can be moved across a substantially solid game board toward one or another of a pair of opposed goal areas by players actuating striker members, the game board being raised intermediate the goal areas and inclining downwardly toward said goal areas, said method comprising:
a. introducing a playing piece on said game board and causing said playing piece to move down an incline of the game board toward one or another of the goal areas,
b. attempting to engage and propel the playing piece approaching a goal area of a player by:
1. holding at least one outer end of a transversely movable support member associated with a goal area, and with said outer end being held with one of the individual hands of that player,
2. transversely shifting said support member associated with one of each of said goal areas in a direction generally transverse to a line extending between said goal areas by movement with said one hand of the player, and
3. generally contemporaneously with the transverse shifting movement of the support member actuating a striker element on the support member by manually actuating with said same one hand a striker actuator on the end of the support member in generally inward transverse movement from said end of said support member.

4,046,381
BOARD GAME WITH SELECTOR DIE

George E. Comeaux, 6 Brookside Circle, North Easton, Mass. 02356

Filed July 26, 1976, Ser. No. 708,733
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AD 24 Claims



13. A game for at least two players comprising in combination a board having a center section and at least one sector extending in a radial direction from said center section toward the periphery of said board, said sector being divided into a plurality of sections arranged in rows each extending in a direction generally transverse to said radial direction,

selector means for randomly generating an ordered sequence of digits,

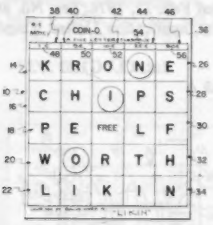
a plurality of tokens each associated with one player and each occupying one of said sections, and

means for translating said ordered sequence of digits into movement of said tokens between sections of said board.

4,046,382
WORD GAME APPARATUS

George L. Ratzkoff, 6560 Racquet Club Drive, Lauderhill, Fla. 33319

Filed Apr. 28, 1976, Ser. No. 681,070
Int. Cl.² A63F 3/06
U.S. Cl. 273—135 B 10 Claims



1. A game apparatus comprising:

a plurality of playing boards each having (comprising) a series of words (pertaining to the same topic) listed in a plurality of rows horizontally (and) disposed on the front face thereof, said words all comprising an equal number of letters and arranged in columns with said letters which occupy the same serial position in each of said words falling in the same column, each of said columns labelled with a numerical value, the rear face of said boards having said words and the definitions thereof disposed thereon the playing boards being divided into a plurality of sets wherein the playing boards within a set contain words pertaining to one specific topic, each playing board within a set having a unique arrangement of words;

a master board comprising a plurality of juxtaposed (justaposed) columns each having one of said numerical values at the top of each of said columns and the letters of the alphabet in sequential order listed in each column;

a score board with a grid disposed thereon the vertical rows thereof labelled with said topics (categories) and horizontal rows adapted to receive therein the players names, the vertical column furthermost from said names labelled "total";

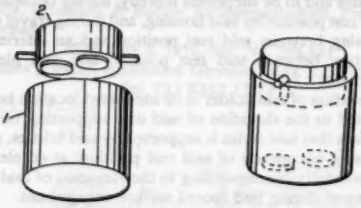
a plurality of markers; and

a plurality of cards comprising random combinations of said numerical values and the letters of the alphabet disposed thereon.

4,046,383
MAGNETIC COLLECTION DEVICE FOR BINGO CHIPS AND SIMILAR GAME PARTS

Sam S. Vidnovic, 2803 Lafayette St., McKeesport, Pa. 15132

Filed Apr. 7, 1976, Ser. No. 674,485
Int. Cl.² A63F 9/00
U.S. Cl. 273—148 R 2 Claims



1. An apparatus for collecting game playing markers comprising:

a. a plurality of markers of material which is attracted by a magnetic force;

b. a magnet;

c. a hollow non-magnetic housing adapted to receive said manget,

1. said housing having sufficient interior dimension to allow said magnet to be moved a significant distance away from the interior surface of the bottom of said housing, and

2. said magnet being normally disposed against said interior surface of the bottom of said housing whereby said markers are attracted to and held against the exterior surface of the bottom of said housing;

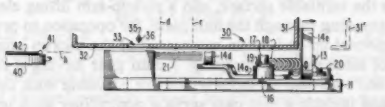
d. means for moving said magnet within said housing away from the interior surface of the bottom of said housing whereby said markers are released; and

e. a container of non-magnetic material having a fixed bottom, sides and open top, said container being adapted to engage and activate said magnet moving means when said housing is inserted in said open top to move said magnet away from the interior surface of the bottom of said housing to release the markers into said container.

4,046,384
STYLUS CLEANING SYSTEM FOR DISC RECORD PLAYER

Thomas Francis Kirschner, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,386
Claims priority, application United Kingdom, Dec. 8, 1975, 50279/75
Int. Cl.² G11B 3/58
U.S. Cl. 274—47 9 Claims



1. In a disc record player including a turntable for rotatably

supporting a disc record during playback; and a pickup stylus subject to engagement with a record surface during said playback, said stylus being mounted at one end of a pickup arm, the opposite end of said pickup arm being pivotally mounted in a housing which is subject to translatory motion between a rest position clear of said turntable and playback positions over said turntable; apparatus comprising the combination of:

a brush comprising a holder, and a plurality of bristles secured in said holder;

means for fixedly supporting said holder in a location in proximity to said turntable and beneath the path of travel of said housing between said rest and playback positions; and

means for controlling the rotation of said stylus arm about an axis substantially parallel to the disc supporting surface of said turntable in a manner causing said stylus to protrude from said housing to a degree sufficient to engage said bristles and to be supported thereby, during occupancy of said rest position by said housing, and during travel of said housing between said rest position and an intermediate position between said rest position and said playback positions;

the elevation of said holder in its supported location being so related to the elevation of said disc supporting turntable surface that said stylus is supported by said bristles, during housing occupancy of said rest position, at an elevation substantially corresponding to the elevation of said stylus obtained during said record surface engagement.

4,046,385

RECORD PLAYERS

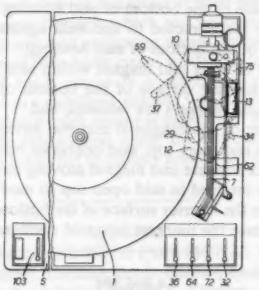
Brian Keith Hunt, Highworth, England, assignor to Plessey Handel und Investments AG, Zug, Switzerland

Filed Dec. 10, 1975, Ser. No. 639,479

Claims priority, application United Kingdom, Dec. 18, 1974, 54817/74

Int. Cl.² G11B *17/12*

U.S. Cl. 274—10 R **9 Claims**



1. A control mechanism for use in a disc-record player having a unit plate, a motor-driven turntable mounted on said unit plate for rotation about an axis perpendicular thereto and having a record-supporting surface, a pickup arm, a pickup-arm carrier structure on which said pickup arm is mounted for pivotal up and down movement away from and towards said surface of the turntable, said pickup-arm carrier structure being equipped with a pickup-arm spindle extending through the unit plate for pivotal operation to move the pickup-arm across the turntable surface, and a pickup-arm lifting element, also extending through the unit plate, for operation to produce such pivotal up-and-down movement of the pickup arm; said control mechanism comprising: a cam gear having a ring of teeth and two cam surfaces which are rotatable with the cam gear and include a first cam surface controlling such up-and-down pivotal movement of the pickup arm and a second cam surface controlling such pivotal movement of the pickup arm across the turntable surface; a pinion rotatably mounted for driving engagement with said ring of teeth, the ring of teeth having, at a predetermined point of its circumference, a gap between successive teeth, wide enough to allow said pinion when facing said gap to rotate without driving the cam gear, said gap determining a position of rest for the cam gear; means for driving said pinion in a predetermined direction determining a forward direction in which the cam gear is driven by said pinion; trip means operable to produce movement of the cam gear in said forward direction from said position of rest through an angle sufficient to ensure engagement of said pinion with the teeth of said ring of teeth; and indexing means for opposing movement of the cam gear from said position of rest, - wherein the said first cam surface has a first ramp, operative, during the initial part of the forward rotation of the cam gear from a said position of rest, for lifting the arm away from said surface of the turntable to a raised position, a holding portion, following this first ramp and operative, during a subsequent part of such forward rotation, to maintain the arm in said raised position, and a second ramp, following said holding portion and operative after said holding portion, during a final part of the cam-gear movement before said position of rest is reached again, to allow the arm to move down from said raised position towards the turntable surface, the said first cam surface being so arranged that when the cam gear is in said position of rest, its said first cam surface can, while said pinion faces said gap, be rotated from said position of rest in a reverse direction, opposite to said forward direction, by an amount sufficient for said second ramp to move the pickup arm to said raised position, the mechanism further including a cueing member operable when the cam gear is in said position of rest, to produce such rotation of said first cam surface in said reverse direction; return spring means for returning said first cam to the said position of rest in said forward direction when said cueing member is released; and damping means operative to damp such return movement.

4,046,386

CONTROL DEVICE

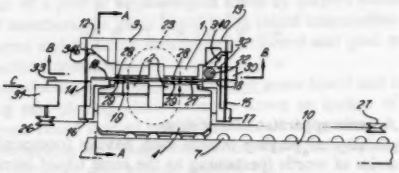
Alexander Bennett Gosling; Keith Douglas Ridler; Frederick James Easthope, and Colin Howard Stanwell-Smith, all of Cambridge, England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland

Filed Feb. 27, 1976, Ser. No. 661,983

Claims priority, application United Kingdom, Feb. 28, 1975, 8501/75

Int. Cl.² G11B *3/38*

U.S. Cl. 274—23 A **5 Claims**



1. A phonograph including a pick-up arm, a first carrier member, the pick-up arm being mounted on the first carrier member, a second carrier member, the second carrier member being mounted for movement along a predetermined straight path, resilient means mounting the first carrier member upon the second carrier member for movement of the first carrier member relative to the second carrier member in directions parallel to the said path, electric motor means for moving the second carrier member along the path, electro-magnetic coupling means between the first and second carrier members, the electro-magnetic coupling means being constituted by a magnet attached to one of the carrier members and a coil attached to the other carrier member, and sensor means for detecting any displacement of the arm from a desired position, a control

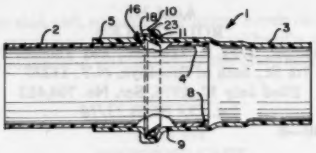
circuit coupled to the output of the sensor means and means to couple from the control circuit a first electric signal in a first higher frequency band to the coil and a second electric signal in a second lower frequency band to the motor means to move the first and second carrier members in such a way as to tend to compensate for any displacement of the arm from the desired position.

4,046,387

DEVICE FOR INDICATING THE PRESENCE OF A GASKET

Dalton I. Lee, 900 DeLaird Drive, St. Louis, Mo. 63137

Filed Sept. 16, 1976, Ser. No. 723,991
Int. Cl.² F16J *15/00*
U.S. Cl. 277—2 **9 Claims**



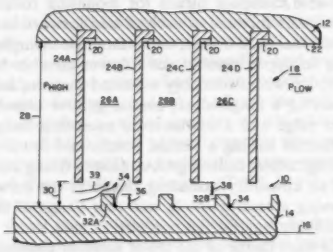
1. In a plastic pipe system including a first pipe, a second pipe, said second pipe having a first end formed to receive an end of said first pipe, said first end having a groove formed in it for receiving a gasket for sealing the joint between said first and said second pipes, the improvement comprising means for indicating proper placement and presence of the gasket after joining of said first and said second pipes, said gasket present indicating means comprising a tab extending axially outwardly from said gasket, said second pipe having an opening in it along said groove for permitting passage of said tab, said tab extending in a direction generally parallel to the axis of said first and said second pipe.

4,046,388

SEAL ARRANGEMENT UTILIZING DEFLECTOR SEALS OF REDUCED RADIAL DIMENSION

Charles A. Meyer, Upper Providence, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 9, 1976, Ser. No. 665,347
Int. Cl.² F16J *15/50*
U.S. Cl. 277—53 **1 Claim**



1. A seal arrangement between a stationary member and a rotatable member disposed therein so as to have a predetermined gap therebetween defining an annular space for reducing the flow of fluid across said annular space from a high pressure to a low pressure region, said seal arrangement comprising:

a plurality of spaced apart circumferential seal strips extending generally radially into said annular space from one of said members and having distal margins spaced from the other of said members;

a plurality of spaced apart circumferential deflector strips extending generally radially into said annular space a distance that is generally 50% to 75% of the distance from the distal margin of the seal strip to the other member and the deflector strips having distal margins spaced from said one member;

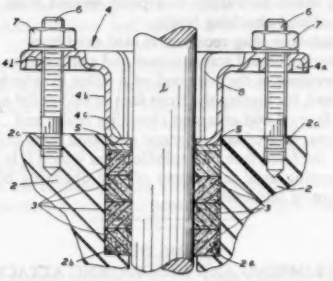
said seal and deflector strips being spaced apart axially generally on the same pitch and disposed generally one-half pitch out of phase with respect to the other so that if extended radially, they would interdigitate and each strip extends into said space a distance such that the sum of the radially extending distance of adjacent opposing strips is less than the gap between the stationary and rotatable members.

4,046,389

STUFFING BOX

Kurt Holzenberger, Frankenthal, Pfalz, Germany, assignor to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany

Filed July 8, 1976, Ser. No. 703,631
Claims priority, application Germany, Aug. 2, 1975, 2534651
Int. Cl.² F16J *15/18*
U.S. Cl. 277—113 **6 Claims**



1. In a stuffing box wherein a receptacle surrounds a portion of a movable member and confines at least one packing which surrounds the movable member and is urged against the periphery of such member and against the internal surface of the receptacle by a gland which is adjustable axially of the movable member to thereby select the extent of deformation of the packing, the improvement which consists in that said gland comprises an annular first section comprising a substantially flat washer spacedly surrounding the movable member and abutting against the packing in the receptacle, and a cupped second section consisting of deep drawn metallic sheet material adjustably secured to the receptacle and engaging with the first section opposite the packing, said second section spacedly surrounding the movable member and having reinforcing means consisting of longitudinal ribs which prevents permanent deformation of said second section under the action of forces which develop when said first section is biased against the packing by said second section.

4,046,390

DEAD STOP STEP CHUCK

Russell H. Dunham, New Fairfield, Conn., assignor to The Dunham Tool Company, Inc., New Fairfield, Conn.

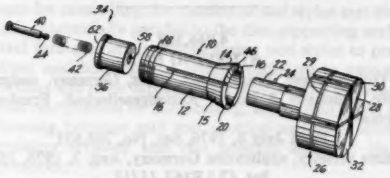
Filed Feb. 27, 1976, Ser. No. 662,158
Int. Cl.² B23B *31/20*
U.S. Cl. 279—1 S **6 Claims**

1. A dead stop chucking assembly for collets, comprising

a. a chucking body comprised of soft metal with a plurality of circumferentially spaced longitudinally extending slots therein;

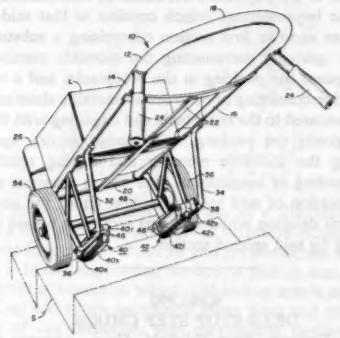
b. a tubular shank extending from the rear face of said body, adapted to be received into the front of a collet bore;

c. a spring collar adapted to be received into the rear end of said collet bore;
d. spring biased screw means adapted to extend through said collar and engage said shank portion in a collet in which it is inserted; the improvement characterized by
e. said chucking body being enlarged to provide a rear spindle engaging surface;
f. said spring collar having an annular abutment defining the extent of insertion thereof into the rear of a collet bore;
g. a radially extending locating pin on said shank portion for longitudinal sliding engagement with a slot in a collet engaged by said assembly;



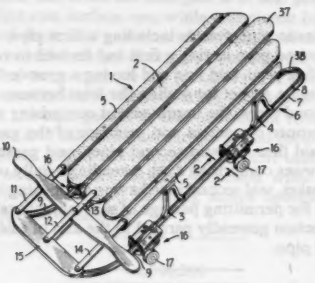
h. an axial bore extending from the rear face of said chucking body shank forwardly to a point spaced from the front face of said chucking body;
i. an elastomer plug received in said axial bore;
j. said spring biased screw means and said annular abutment cooperating at the rear end of a collet in which they are inserted, for biasing the front face of said collet against the rear face of said enlarged chucking body; and
k. said rear face of said enlarged chucking body cooperating with the front face of a spindle upon which it is mounted, preventing axial movement of said chucking body upon closure of said collet.

4,046,391
STAIR CLIMBING AND DESCENDING ATTACHMENT FOR A HAND TRUCK
Everett L. Restad, Faribault, and Roger W. Pitan, Medford, both of Minn., assignors to Nutting Truck and Caster Company, Faribault, Minn.
Filed June 14, 1976, Ser. No. 695,582
Int. Cl.² B62B *1/04*
U.S. Cl. 280—5.24 **6 Claims**



1. A stair climbing and descending attachment for use with a hand truck to support the hand truck slidably on the edge of a stair, the attachment comprising:
frame means for rigid attachment to the hand truck; and
slide means including a low-friction material secured to said frame means for slidably engaging the stair edge;
said slide means including a pair of elongated rail members secured to said frame means;
each said elongated rail member including an elongated slide secured thereto, which elongated slide is comprised of said low-friction material for slidably engaging the stair edge;
said frame means further including two truss members each having one of said elongated rail members secured thereto;
said elongated rail members being substantially identical and each comprising two substantially identical half members, each of which is symmetrical about a plane bisecting it transversely, secured together with a face of one half member in contact with a face of the other half member to capture one of said elongated slides therebetween; and
said elongated slides, each of which is symmetrical about a plane bisecting it transversely, being substantially identical.

4,046,392
ROLLER SLED
Edward Dredger, 2752 E. 22nd St., and Thomas Passantino, 26-42 E. 7th St., both of Brooklyn, N.Y. 11235
Filed July 12, 1976, Ser. No. 704,412
Int. Cl.² B62B *13/18*
U.S. Cl. 280—8 **6 Claims**

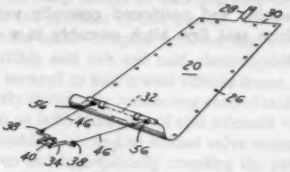


1. A roller sled comprising a bed, a pair of forward and rearward braces attached adjacent each side of said bed and extending downwardly therefrom, an inverted T-shaped runner formed of a lower runner blade and an upper ridge attached to each pair of braces and having a flexible portion forward of said forward brace, a steering bar linkably connected to said bed and to said flexible portion of each runner, and removable clamping means for mounting roller wheels onto said runners forward of each of said forward braces and adjacent said rearward braces; said removable clamping means comprising an upper member and a lower member having at least one roller wheel rotatably mounted thereon, said upper member having a longitudinal central groove closely fitting said runner ridge and a downwardly extending flange at the rear end thereof having a central notch, said lower member having a longitudinal central groove closely fitting said runner blade and an upwardly extending flange at the forward end thereof having a central notch, said rear flange of the upper member abutting against the rear end of said lower member and said forward flange of the lower member abutting against the forward end of said upper member, one of said two members having means along each side thereof for lockably engaging the corresponding side of the other member.

4,046,393
PORTABLE SLED
Kenneth Vadnais, 20322 Beatrice, Livonia, Mich. 48152
Filed Mar. 4, 1976, Ser. No. 663,771
Int. Cl.² B62B *15/00*
U.S. Cl. 280—19 **19 Claims**

1. A portable sled comprising, an oblong flexible plastic sheet having a front end and a back end, a bar extending transversely along at least a portion of the front end of the sheet and

fastened thereto, the bar including engagement means at one end thereof, a separate crankhandle, engagement means on the crankhandle adapted to engage the engagement means on the bar thereby permitting rotation of the crankhandle to tightly



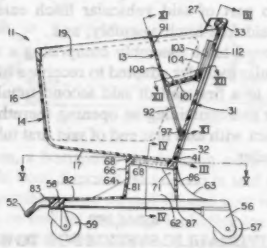
roll up the sled, and, separate attachment means on the sled and separate attachment means on the crankhandle to permit at least one alternative attachment of the crankhandle with the sled.

4,046,394

SHOPPING CART

William A. Thompson, Jr., Toms River, N.J., assignor to Roblin Industries, Inc., Battle Creek, Mich.

Filed Oct. 3, 1975, Ser. No. 619,298
Int. Cl.² B67B *3/02*
U.S. Cl. 280—33.99 B **19 Claims**



1. In a basket having a collapsible baby seat assembly mounted on one wall thereof, comprising the improvement wherein:

said one wall of said basket has a pair of substantially vertically extending rails fixedly mounted thereon and disposed in spaced parallel relationship, said one wall being molded in one piece of a plastics material and said rails being an integral molded part of said one wall, said pair of rails defining a pair of grooves which extend longitudinally of the rails and open in opposite relationship to one another, said rails also having stop means associated therewith for effectively closing off the lower ends of said grooves;

said baby seat assembly including a backrest member hingedly mounted on said one wall, said backrest member being molded in one piece of a plastics material and including a substantially planar platelike back portion and a pair of substantially parallel support arms fixed to one edge of said back portion and projecting downwardly therefrom substantially within the plane defined by said back portion, said arms having the lower free ends thereof hingedly connected to said one wall in the vicinity of the lower edge thereof; and

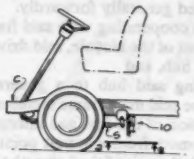
said baby seat assembly also including a substantially planar seat member hingedly connected adjacent one edge thereof to said backrest member in the vicinity of the junction between the back portion and the support arms, said seat member also being molded in one piece of a plastics material and including a pair of guide means which project into and are slidably and rotatably received within the grooves formed in said rails.

4,046,395

METHOD AND APPARATUS FOR REDUCING VEHICLE SIDE SWAY

Paul W. Smith, III, P.O. Box 868, Burbank, Calif. 91503

Filed Oct. 29, 1975, Ser. No. 626,900
Int. Cl.² B62D *21/00*
U.S. Cl. 280—106.5 R **12 Claims**



1. An arm adapted to substantially reduce the side sway of a vehicle due to twisting of the vehicle frame side-rails where such vehicle utilizes leaf springs and spring shackle plates secured to the side-rails of the vehicle frame, said side-rails having a bottom flange, comprising:

a rigid arm rigidly connected at opposite ends to the rear shackle plates of the front leaf springs at or immediately rearward of the vertical center line of said shackle plates, said shackle plates being secured to straightened frame side-rails; and,

means for connecting the arm to the bottom flanges of the respective side-rails to prevent said flanges from twisting.

4,046,396

HEAVY DUTY DIRT BICYCLE AND FRAME THEREFOR

James Michael Morrison Taylor, 3404 Castor St., Santa Ana, Calif. 92704, and Gene R. Troke, 15343 Illinois Ave., Paramount, Calif. 90723

Filed Feb. 25, 1976, Ser. No. 661,362
Int. Cl.² B60K *25/04*
U.S. Cl. 280—281 R **1 Claim**

1. A heavy-duty bicycle which comprises:

a. front and rear wheels,

b. handlebars,

c. a bicycle seat,

d. frame means for mounting said front and rear wheels, said handlebars and said seat, said frame means including a continuous main frame member, said member having an elongate, upwardly and rearwardly projecting first portion, an elongate upwardly and forwardly projecting second portion and an arcuate intermediate portion joining lower ends of the first and second portions into a planar, generally broad V-shaped structure,

a front wheel fork swivel socket and means fixing the socket to an upper end of the second main frame portion, the axis of the socket being in the plane of the frame member,

a front wheel fork having a pivot tube pivotally received

by the swivel socket, and having a pair of mutually spaced, opposing elongate tubular front wheel mounting members, and including reinforcing elements disposed within at least upper portions of the mounting members,

the reinforcing elements each comprising an elongate formed metal angle configured to tightly engage inner surfaces of the mounting members when inserted thereinto, thereby being retained in the installed position by spring action of the angle, the angle formed by the legs of the reinforcing elements being about 60° and wherein, upon installation, the apexes of the elements are directed generally forwardly.

e. drive means cooperating with said frame means for causing movement of the bicycle, said drive means including a pedal crank hub, and

f. means joining said hub to a generally forward facing surface of the said main frame member relatively adjacent the intersection of the first and intermediate portions and relatively remote from a lowest point of the intermediate portion, with the axis of the hub orthogonal to the plane of the frame member, the hub being thereby positioned within the boundaries of the frame member and being protected thereby from damage during use of the bicycle.

4,046,397

REFLECTOR DEVICE FOR BICYCLES

John V. Kitrell, 1830 N. 49th, Lincoln, Nebr. 68504

Filed June 1, 1976, Ser. No. 691,822
Int. Cl.[2] B62J 5/20
U.S. Cl. 280—289 R 9 Claims

1. A safety reflector device, comprising, a support means, and a plurality of flat, substantially rectangular members having opposite ends and opposite sides, said members being selectively pivotally secured, at one end thereof, to said support means,

said members having a light reflective surface on at least one side thereof,

said members being selectively pivotally movable from a superimposed stored position to a fan-shaped operative position,

said members having substantially their entire lengths spaced from each other, when in said operative position, so that the device will present a large reflective mass when viewed from a distance and so that the device will become a distinguishable object as the light source approaches the device from said one side.

4,046,398

HIGH CLEARANCE VEHICLE HITCH

George O. Dunwoody, 62 E. 106th Place, North Glenn, Colo. 80233

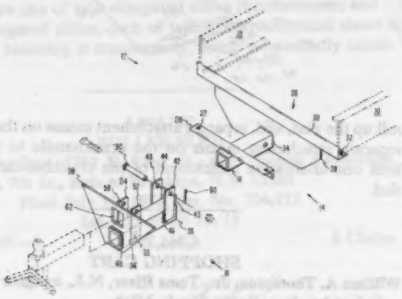
Filed May 26, 1976, Ser. No. 690,008
Int. Cl.[2] B60D 1/16
U.S. Cl. 280—415 R 8 Claims

1. A vehicular hitch for use with a high clearance vehicle and having multiple hitch placements comprising:

a. a first hitch assembly rigidly attached to a vehicular frame and positioned at essentially the height of said vehicular frame;

b. said first hitch assembly comprising a first tubular rectangular cylinder adapted to receive a hitch and a first support securing a first end of said first tubular rectangular cylinder to the said vehicular frame and a second support securing a second end of said first tubular rectangular cylinder to said vehicular frame;

c. a second hitch assembly removably attached to said first hitch assembly and positioned generally vertically removed from said first hitch assembly in a downward direction;



d. said second hitch assembly being removable in such a way that upon removal of said second hitch assembly, essentially no part of said vehicular hitch extends vertically below said first hitch assembly; and

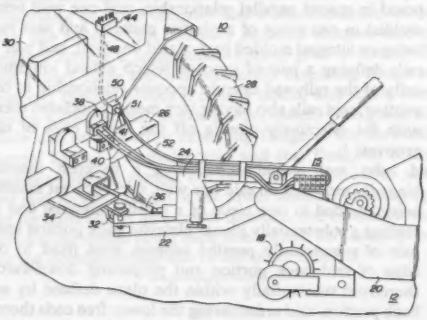
e. said second hitch assembly comprising a second tubular rectangular cylinder adapted to receive a hitch and a plate secured to a first end of said second tubular rectangular cylinder and containing an opening therethrough adapted to interact with said first end of said first tubular rectangular cylinder.

4,046,399

ELECTROHYDRAULIC SYSTEM FOR TOWED VEHICLE

Kenneth W. Zeuner, Newtown, and Alonzo B. Jarman, Wrightstown, both of Pa., assignors to Control Concepts, Inc., Newtown, Pa.

Filed Nov. 5, 1975, Ser. No. 628,967
Int. Cl.[2] B60D 1/08
U.S. Cl. 280—420 14 Claims



1. In a vehicle towed by a tractor having a cab, the towed vehicle having a frame and hydraulic functions powered by a plurality of hydraulic devices to be controlled in which the improvement combination comprises:

an electrohydraulic valve assembly having solenoid operated valves, said electrohydraulic valve assembly being hydraulically coupled to said plurality of hydraulic de-

vices and rigidly secured to said frame of said towed vehicle,

a switching assembly comprising a plurality of switching devices adapted for electrically switching said solenoid operated valves thereby to control said plurality of hydraulic devices, said switching assembly disposed within said cab for easy access of said plurality of switching devices to the operator of said tractor,

electrical cable means coupled between said switching assembly within said cab and said electrohydraulic valve assembly secured to said towed vehicle frame, and

means directly electrically connecting each of said switching devices to an individual pair of said solenoid valves, said valve assembly including an unload valve normally maintained open and hydraulically coupling the pressure and tank of said tractor whereby upon actuation of each switching device one solenoid valve of the respective pair is energized and said unload valve is switched to the valve closed state.

4,046,400

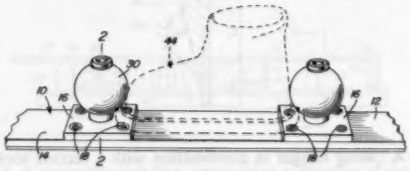
BALL SKI BINDING

Felix A. Viletto, 116 Ford City Road, Freeport, Pa. 16229

Filed May 12, 1976, Ser. No. 685,883

Int. Cl.[2] A63C *9/08*

U.S. Cl. 280—626 **19 Claims**



1. In combination, a horizontal ski defining a ski boot sole receiving area, a ski boot disposed on said ski in said area, and first and second coacting means on said ski and boot releasably retaining said boot on said ski, said boot including toe and heel portions defining upwardly and outwardly opening oppositely inclined V-shaped notches defining said second means, said first means including a pair of abutment members having adjacent portions defining downwardly facing partial spherical abutment surfaces opposing and seated in said notches, support means supporting said abutment members in predetermined positions on said ski and for limited shifting of each abutment member upwardly away from said ski in all directions within an inverted conical zone thereabove, said support means including shifting resisting means yieldingly resisting shifting of said abutment members from said predetermined positions.

4,046,401

FOLDING BABY CARRIAGE

Kenzou Kasai, Higashishimizu, Japan, assignor to Kasai Kabushikikaisha, Osaka, Japan

Filed May 24, 1976, Ser. No. 689,463

Claims priority, application Japan, Dec. 4, 1975, 50-145550

Int. Cl.[2] B62B *11/00*

U.S. Cl. 280—650 **1 Claim**

1. A folding baby carriage comprising:

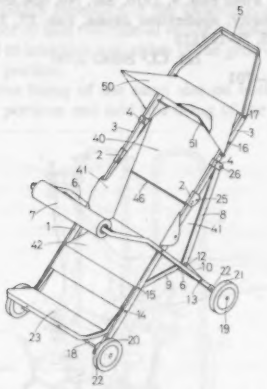
a pair of front leg members provided with front wheels rotatably mounted on lower ends thereof;

a pair of rear leg members pivotally connected to said front leg members and provided with rear wheels rotatably mounted on lower ends thereof, said rear legs being a first U-shaped bar having a center portion which forms a protecting portion;

a pair of supporting bars which are connected backwardly rotatable to upper ends of said front leg members by rotatable joints, said supporting bars being a second U-shaped bar having a center portion which forms a handle;

a pair of first connecting bars respective first ends of which are pivotally connected to said front leg members by a first reinforcement bar positioned transversely between said front leg members;

a pair of second connecting bars respective first ends of which are pivotally connected to said rear leg members by



a second reinforcement bar positioned transversely between said rear leg members;

a pair of third connecting bars and attachment means, first ends of said pair of said third connecting bars being pivotally connected to said pair of supporting bars by said attachment means; and

a pivoting bar pivotally connecting all other ends of said pairs of first, second and third connecting bars.

4,046,402

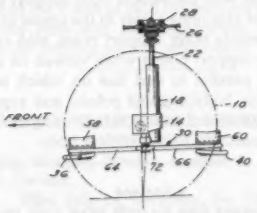
BALL JOINT SUSPENSION FOR A MOTOR VEHICLE

William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1975, Ser. No. 593,802

Int. Cl.[2] B60G *11/18*

U.S. Cl. 280—674 **4 Claims**



1. A ball joint suspension for a motor vehicle having a vehicle frame;

a wheel positioning member connected to said vehicle frame;

a wheel support member constructed to rotatably support a road wheel;

said wheel positioning member having fore and aft branch portions connected to said vehicle frame and a laterally extending portion comprising parallel rods that are interconnected at their outer ends by a loop;

said loop defining a small opening in which the socket of a ball joint is secured by a press fit;

reinforcing means engaging said parallel rods adjacent said loop;

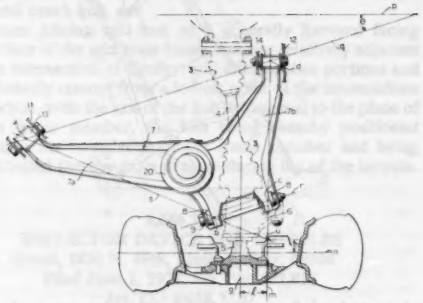
said joint having a stud connected to said wheel support member.

4,046,403

STRUT TYPE INDEPENDENT SUSPENSION SYSTEM FOR AUTOMOBILES

Hiroshi Yoshida, Toyokawa, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 9, 1976, Ser. No. 656,696
Claims priority, application Japan, Feb. 17, 1975, 50-18766; Dec. 22, 1975, 50-153115
Int. Cl.² B60G 3/06
U.S. Cl. 280—701 18 Claims



1. A strut type independent suspension system for a non-steerable wheel of a road vehicle, comprising a unitary suspension arm having two vehicle body pivotal support points thereon spaced generally in the direction of the length of the vehicle and two axle housing pivotal support points spaced generally in the direction of the length of the vehicle, an axle housing mounted on said suspension arm for rotation only around an axis between said axle housing pivotal support points, an axle on said axle housing extending perpendicular to the length of said vehicle, the vehicle body pivotal support point and the axle housing support point which are farthest from the middle of the vehicle body along the length thereof when viewed on a horizontal projection lying on a line parallel to said axle, said vehicle body support points when viewed on a horizontal projection lying on a line which is at an angle to the axis of said axle with the vehicle body support point of said line parallel to said axle lying closer to the center of the vehicle than the other vehicle body support point, said axis between said axle housing support points when viewed on a horizontal projection being parallel to said line on which said line between said vehicle body support points, and support means having one end connected to said axle housing and having the other end for connection to the vehicle body.

4,046,404

CARBONLESS PAPER FOR USE IN ELECTROSTATOGRAPHIC COPIERS

George Treier, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 26, 1976, Ser. No. 744,917
Int. Cl.² B41L 1/36; B32B 3/00
U.S. Cl. 282—27.5 17 Claims

1. A carbonless paper sheet suitable for imaging in electrostatographic copiers which comprises a base sheet of paper making fibers having uniformly distributed therein from about 0.05 to 10 weight percent of hollow, generally spherical particles ranging in diameter from ½ to about 200 microns, said carbonless paper also containing a color forming material encapsulated in discrete capsules and/or a color developing material.

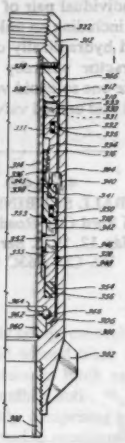
6. The paper sheet of claim 1 wherein a color forming material encapsulated in discrete capsules is coated on one side thereof along with a binder to hold the capsules in place.

4,046,405

RUN-IN AND TIE BACK APPARATUS

James Vaull Bonds, Houston, Tex., assignor to McEvoy Oilfield Equipment Co., Houston, Tex.

Continuation of Ser. No. 253,516, May 15, 1972, abandoned.
This application Jan. 22, 1975, Ser. No. 543,123
Int. Cl.² F16L 35/00
U.S. Cl. 285—3 61 Claims



1. A casing hanger in combination with a second tool for supporting conduit and for connecting such conduit to a riser having righthand rotated engageable connections, comprising:

a tubular body;

means for supporting such conduit from said tubular body;

fastening means for unfastening a first tool attached to such riser from said tubular body; said fastening means permitting the unfastening of said first tool from said tubular body upon a righthand rotation of such riser;

connecting means for connecting a second tool attached to such riser to said tubular body; said connecting means permitting the connecting of said second tool to said tubular body upon a righthand rotation of such riser, and

said second tool including means for disconnecting said second tool from said connecting means upon a downward force on a portion of said second tool and then an upward lift on said second tool.

4,046,406

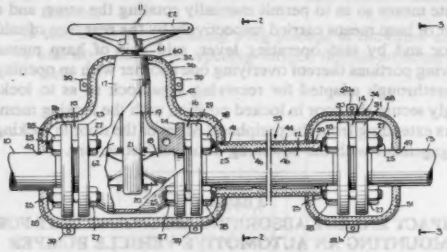
FIRE-SAFE JACKET FOR FLUID PIPING COMPONENTS

Irving D. Press, West Orange; Helm A. Rink, North Haledon, and Harvey R. Nickerson, Roseland, all of N.J., assignors to Resistoflex Corporation, Roseland, N.J.

Filed May 15, 1975, Ser. No. 577,849
Int. Cl.² F16L 59/16
U.S. Cl. 285—47 12 Claims

10. A fire-safe plastic-lined fluid piping component comprising a metal piping component lined with a heat softenable plastic material, and a jacket surrounding said component with a predetermined air gap between the exterior of said component and the interior of said jacket, said jacket comprising a layer of metallic skeletal material disposed within a body of fibrous refractory material united with an inorganic bonding material to form a substantially impact and crush resistant enclosure and cooperating with adjacent piping portions to

contain a substantially fixed air volume therebetween, said fibrous material being capable of withstanding a flame temperature in excess of 1200° F., and all surfaces of said jacket are sealed with a coating layer of a liquid-impermeable material.

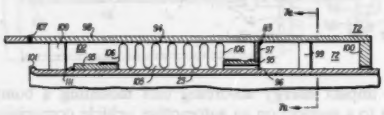


4,046,407

ELONGATED CRYOGENIC ENVELOPE

Tom Porreco, Denver, Colo., assignor to Cryogenic Technology, Inc., Denver, Colo.

Filed Apr. 18, 1975, Ser. No. 569,474
Int. Cl.² F16L *39/00*
U.S. Cl. 285—133 R **4 Claims**



1. A cryogenic structure comprising a plurality of elongated cryogenic envelope sections, each section including:
an inner tube;
an outer tube generally coaxial with said inner tube;
means for supporting said inner tube within said outer tube, said means for supporting including a means for providing a vacuum in at least a portion of the volume between said inner tube and said outer tube; and, wherein:
the outer tubes of said sections are joined together to form a continuous outer tube, but the inner tubes of at least two of said sections are unjoined so that fluid passing through the inner tubes is permitted to pass between said unjoined portions and said unjoined portions are permitted to move relative to each other during contraction or expansion, the adjacent ends of said inner tubes being flared outwardly toward said outer tube to allow objects to be pulled through said inner tubes without snagging thereon.

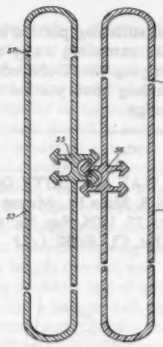
4,046,408

OMNI-DIRECTIONAL FASTENER

Steven Ausnit, 124 E. 61st. St., New York, N.Y. 10021

Continuation of Ser. No. 385,408, Sept. 3, 1973, abandoned. This application Aug. 20, 1975, Ser. No. 605,984
Int. Cl.² F16L *25/00*; A44B *17/00*
U.S. Cl. 285—188 **4 Claims**

1. A fastener assembly comprising in combination:
first and second interlockable resiliently flexible fastener strips each having a continuous sheet form longitudinally extending web portion and each having a resiliently flexible longitudinally extending locking portion;
each of said fastener strips having said web and locking portions thereof integrally connected in substantially a common plane, and said web portion providing connecting means;
each locking portion having a first two continuous shaped locking profile ribs extending therealong and projecting a first lateral direction;
each locking portion having a second two shaped locking profile ribs extending continuously therealong projecting in a second opposite direction;
each of said ribs projecting individually from its locking portions
each of said first and second two shaped ribs of each locking portion having a continuous locking groove therebetween interlockingly receptive of the locking profile of sid ribs and either of said two ribs of either locking portion being adapted to interlock into either of the grooves of the other locking portion;
said grooves being of the same size on both sides of said locking portions and said ribs being of the same sized on



both of said locking portions so that said fastener strips may be interlocked from either lateral direction;
each web portion extending in a respective plane which is substantially parallel to the plane of the other web portion when the ribs and grooves are interlocked;
each of said ribs being individually resiliently flexible and being arrow shaped with a central tip and barbs extending laterally at each side of the tip so that in the interlocked relation of the fastener strips two selected ribs of the first strip will be interlocked with two selected ribs of the second strip;
and the distance between said barbs at each groove being less than the width of each rib between its barbs so that the ribs can snap into interengagement andthe barbs will retain the locking portion interlocked.

4,046,409

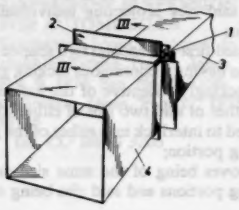
JOINING ARRANGEMENT FOR VENTILATION DUCTS AND THE LIKE

Eskil Virgin, Kungalv, Sweden, assignor to Vavra Plat AB of Kungalv, Sweden

Filed July 14, 1976, Ser. No. 705,017
Claims priority, application Sweden, Aug. 13, 1975, 7509047
Int. Cl.² F16L *25/00*
U.S. Cl. 285—305 **2 Claims**

1. A joint for joining the confronting edge portions of panels of ventilation ducts or the like, said joint comprising:
a first member including a pair of overlying legs defining a flat, U-shaped cross section telescopically receiving therein one panel edge to be joined, one leg of said pair of legs comprising a portion extending angularly from said one leg and forming a reverse-fold defining a raised edge, said reverse-fold continuing in a panel portion overlying said one leg forming the raised edge and comprising a free-edged panel extending beyond said one leg; and
a second member including a substantially flat, S-shaped cross section including a socket portion receiving another panel edge to be joined, said free-edged panel of the first

member extending into a second socket portion of said S-shaped cross section, said second socket portion of the S-shaped cross section continuing in a reverse-folded stiffening portion extending outwardly from said S-shaped



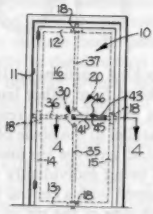
cross section, said stiffening portion including a laterally projecting portion extending away from the stiffening portion and overlying the U-shaped cross section and including a depending hook portion snappingly-engaged onto said raised edge.

4,046,410

FOUR WAY SECURITY DOOR

Robert I. Connell, 896 S. Main St., Mount Holly, N.C. 28120

Filed May 27, 1976, Ser. No. 690,566
Int. Cl.² E05C *1/12*
U.S. Cl. 292—36 **10 Claims**



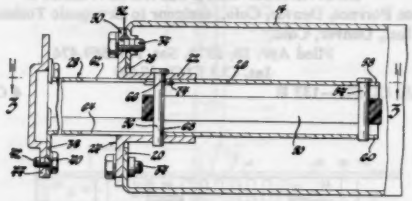
1. A security door assembly adapted for securing the sides of a door in locking engagement with an adjacent door jamb structure, said door assembly comprising a rectangular frame having interconnected upper, lower, and opposing side members which collectively define the respective peripheral edges of the door; front and rear substantially rectangular panels mounted on opposite sides of said rectangular frame coextensive therewith and defining the front and rear faces of the door with a hollow interior portion located therebetween; respective openings provided in medial portions of each of the upper, lower, and opposing side members of said frame and communicating with the hollow interior portion of the door; respective guide means provided within the hollow interior portion of the door and adjacent the respective openings in the upper, lower and opposing side frame members of said door, rotatable plate means located within the hollow interior portion of the door; means cooperating with said rotatable plate means and with said frame and mounting said plate means for rotatable movement about a predetermined axis located medially of the plate means; four elongate locking members positioned within the hollow interior portion of the door, a distal end portion of each of said locking members cooperating with a respective one of said guide means and being positioned for protruding through a respective peripheral edge of the door; means cooperating with the proximal end portions of the respective elongate locking members for pivotally connecting the same to said rotatable plate means at locations radially spaced from said predetermined medial axis thereof so that when the plate means is rotated, the respective locking members are moved longitudinally to protrude from the respective peripheral edges of the door and engage the adjoining door jamb structure to lockingly secure the door in place; an operating lever located on the rear face of the door and cooperating with said rotatable plate means so as to permit manually rotating the same; and a pair of hasp means carried respectively by the rear face of said door and by said operating lever, said pair of hasp means having portions thereof overlying one another with an opening therethrough adapted for receiving a padlock so as to lockingly secure the door in locked position with the locking members extending from the peripheral edges of the door in locking engagement with the adjoining door jamb structure.

4,046,411

IMPACT ENERGY ABSORBING MOUNTING UNIT FOR MOUNTING AN AUTOMOTIVE VEHICLE BUMPER ASSEMBLY

Raymond L. Richard, Jr., Port Clinton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 1, 1976, Ser. No. 746,421
Int. Cl.² B60R *19/06*
U.S. Cl. 293—88 **2 Claims**



1. An impact energy absorbing unit mounting a bumper assembly to a support on an automotive vehicle comprising a one piece hollow cylindrical body terminating at one end in a plurality of integral mounting straps that extend radially outwardly of said body for attachment to said bumper assembly, means attaching each of said straps to said bumper assembly, said straps being arcuately spaced from one another, said cylindrical body having diametrically aligned notches formed in the other end thereof and further having a pair of aligned elongated tracks extending along opposite sides of said body, a bracket for attachment to said vehicle supporting said body for longitudinal movement therethrough, a first pin mounted in said notches and a second pin extending through said bracket and received in one end of said elongated tracks, resilient energy absorbing means disposed in said cylindrical body and extending around said first and second pins and yieldable in response to an impact load applied to said bumper assembly causing said body to longitudinally move in said bracket to extend said energy absorbing means which dissipates the energy of said impact load, said energy absorbing means providing a force restitution to return said body toward an original pre-impact position in response to removal of the impact load from said bumper assembly.

4,046,412

CABINET WITH LOCK RELEASE

Walter F. Lee, Bloomington, Minn., assignor to J. N. Johnson Company, Inc., Minneapolis, Minn.

Filed Jan. 30, 1976, Ser. No. 653,942
Int. Cl.² E05C *3/08*
U.S. Cl. 292—200 **3 Claims**

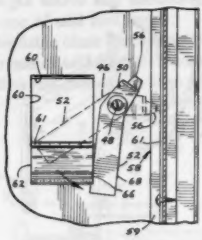
1. A cabinet with lock release comprising:
a. first and second sidewalls connected to
b. a bottom wall and
c. a top wall,
d. a door pivotally connected to a sidewall,
e. a lock mounted on said door and extending within said cabinet,
f. a latch arm pivotally connected to the inner end of said

lock for operation by said lock and including a lip at one end engageable with

g. catch means carried by a wall of said cabinet internally thereof,

h. said latch arm including a leg portion at the other end,

i. said door having an opening formed therein adjacent said lock,



j. a plate pivotally mounted on the door at the edge of the opening and forming a closure for the opening,

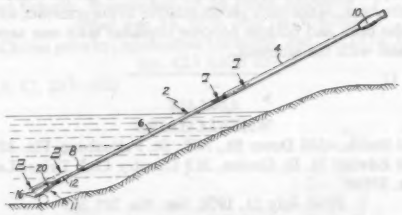
k. said plate pivotally movable from the opening into the cabinet with the edge of the plate contacting and pivoting said leg portion of said latch arm independent of said lock for disengagement of said lip of said latch arm from said catch means to allow opening of said door.

4,046,413

GOLF BALL RETRIEVER

John Jeninga, Delavan, Wis., assignor to Atlantic Products Corporation, Trenton, N.J.

Filed Sept. 14, 1976, Ser. No. 723,598
Int. Cl.² A63B 47/02
U.S. Cl. 294—19 A 5 Claims



1. In a golf ball retriever having an elongated handle, a ball retainer secured to said handle, an opening in one side of said retainer large enough to pass a golf ball therethrough and a pivoted gate within said retainer freely swingable to but not through said opening to hold a golf ball in said retainer and swingable away from said opening to admit a golf ball therethrough and past said gate, the improvement comprising:

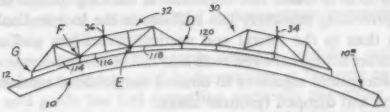
said retainer being in the form of two spaced loops lying in planes generally parallel to the axis of said handle and extending from one end thereof, said gate being pivoted to said handle between said loops and swingable to but not through either of said loops whereby a golf ball may enter said retriever through either one of said loops and be discharged therefrom through the other loop by merely inverting said retainer.

4,046,414

APPARATUS FOR HOISTING A STRUCTURAL MEMBER

Arthur M. James, 2475 NW. 158th, Beaverton, Oreg. 97005, and Charles J. Conlee, 6938 SW. 8th., Portland, Oreg. 97219

Filed May 3, 1976, Ser. No. 682,220
Int. Cl.² B66C 1/10
U.S. Cl. 294—81 R 4 Claims



1. In combination with a structural member, where said member includes an upper surface expanse and a lower surface expanse and truss A-frames interconnecting the expanses with the expanses spaced from each other and with the truss A-frames imparting rigidity to the structural member, said truss A-frames having apexes joined to and adjacent the upper surface expanse of the structural member,

an elongate load-distributing device spaced above such structural member, and hoist means connected to the device operable to lift the device,

multiple elongate strands connected to and depending from the base of the load-distributing device at points distributed along the length thereof, and

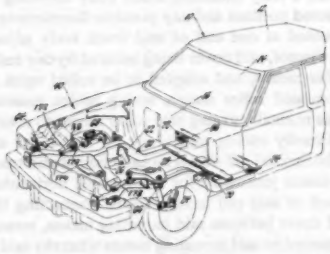
means connecting a bottom end of a strand to said structural member including a hanger with structure straddling the apex of an A-frame and engaging the A-frame adjacent its apex in a manner enabling the imparting of a lifting force thereto.

4,046,415

BODY MOUNT SYSTEM FOR A MOTOR VEHICLE

Gerard T. Klees, Rochester; Robert A. Meacham, St. Clair Shores; Harry M. Ruby, Walled Lake, and Edward Sich, St. Clair Shores, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 8, 1976, Ser. No. 675,174
Int. Cl.² B62D 23/00
U.S. Cl. 296—35 R 2 Claims



1. A motor vehicle comprising: a unitary frame-body defining a passenger compartment and having a front bulkhead structure, reinforced front fenders attached to the front bulkhead structure of the unitary frame-body, a radiator support member extending transversely between the reinforced front fenders at their forward ends, reinforcement members extending between the bulkhead structure and the radiator support member and attached to their respective lower ends to stiffen the fenders and the radiator support against motion relative to the unitary frame-body, a sub-frame having laterally spaced side rails extending from the radiator support to generally midway the length of the unitary frame-body, first body mounts acting between the radiator support and the side rails at

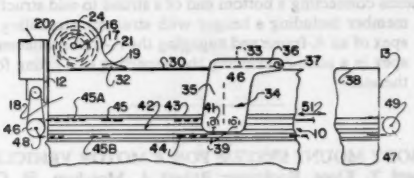
the forward ends thereof, second body mounts acting between the bulkhead structure of the unitary frame-body and the side rails of the sub-frame, and third body mounts acting between the unitary frame-body and the side rails of the subframe at the rearward end thereof, each of the body mounts having an elastomeric means subjected to substantially pure shear deformation in the longitudinal direction and a combination of shear and compression deformation in the lateral and vertical directions so as to lessen ride harshness in the longitudinal direction by providing relatively less stiffness in the longitudinal direction than in the lateral and vertical directions, and a shock absorber acting between each side rail of the sub-frame and the reinforcement members to control longitudinal motion of the frame and dampen resonant shake.

4,046,416

TRUCK COVER AND MECHANISM FOR OPERATING SAME

Jacob Penner, 335 - 47th Ave., SW., Calgary, Alberta, Canada (T2S 1C1)

Filed Mar. 11, 1976, Ser. No. 665,923
Claims priority, application Canada, Apr. 25, 1975, 225840
Int. Cl.[2] B60J *11/00*
U.S. Cl. 296—98 **7 Claims**



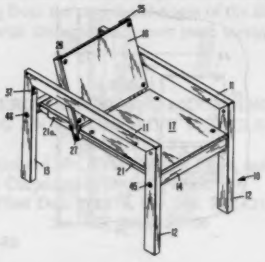
1. In a truck which includes a cab, an open top body including a pair of spaced and parallel sides and spaced and parallel rear and front ends, and a source of electrical power in said truck; a truck body cover assembly, said assembly comprising in combination a substantially rectangular flexible cover movable between a fully extended, truck body covering position and a retracted position and any position therebetween, roller means mounted at one end of said truck body adjacent the upper side thereof, said cover being secured by one end thereof to said roller means, and adapted to be rolled upon and dispensed from said roller means, spring return means in said roller means normally urging said roller means to rotate in one direction thereby rolling said cover on said roller means as aforesaid, horizontal rail means on each side of said truck body, mounting means journalled for longitudinal horizontal movement in each of said rail means, means connecting the other end of said cover between said mounting means, means operatively connected to said mounting means whereby said cover is extendible from said roller means against pressure of said spring return means, across the open top of said truck body when said cover is in a truck body covering position and is retracted upon said roller means when in a cover storage position and an endless chain operatively connected between said mounting means upon each side of said truck body and said source of power, each of said chains including an upper run and a lower run, said upper runs being connected to said mounting means, said horizontal rail means including an upper horizontal channel and a lower horizontal channel spaced and parallel to said upper horizontal channel, said upper runs engaging through said upper horizontal channels, and sprockets mounted adjacent each end of said horizontal rail around which said chains extend.

4,046,417

FOLDING FURNITURE PIECE

Charles R. Beckley, 2708 Woodley Place, NW., Washington, D.C. 20008

Filed July 20, 1976, Ser. No. 707,085
Int. Cl.[2] A47B *85/04*
U.S. Cl. 297—16 **14 Claims**



1. A seat comprising:
- a pair of armrests having front and rear ends, said armrests defining two sides of the seat;
- a back pivoted to said armrests at points intermediate the ends of said armrests;
- a bottom;
- means for pivotally connecting said bottom to said back, wherein said bottom can pivot to be coplanar with said back and to be at an angle with said back;
- spacer means extending between the two sides of the seat below the level of the armrests;
- support means for supporting releasably the front end of the bottom at a level below the level of the armrests;
- front and rear legs pivoted adjacent to the front and rear ends of each armrest, respectively, wherein the legs fold along the arms when the back and bottom are coplanar with one another to form a folded seat;
- rigid bracing means, secured to and coextensive with said bottom for engaging adjacent to said front and rear legs on each side of said chair to keep said legs from folding; wherein the bottom and back cooperate to form a seat when the front end of the bottom is suppor.ed by said support means and wherein the bottom pivots relative to the back, as the back pivots relative to the armrests, so that the back and bottom become coplanar with one another and with the armrests.

4,046,418

WHEELCHAIRS

Royal Smith, 4646 Dover St., NE., St. Petersburg, Fla. 33703, and Edward H. D. Carson, 200 Country Club Drive, Largo, Fla. 33540

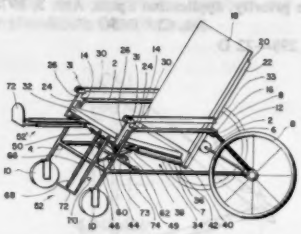
Filed July 21, 1976, Ser. No. 707,203
Int. Cl.[2] A47C *13/00*
U.S. Cl. 297—118 **5 Claims**

1. A wheelchair convertible into a wheeled stretcher, comprising:
- a pair of wheeled support frame members horizontally spaced from one another, each having a corresponding rearwardly positioned first pivot and a forwardly positioned second pivot at substantially the same elevation;
- a pair of first levers, each having a first length and pivotally mounted on a respective one of said first pivots;
- a chair back support having two lateral sides each proximate to a respective one of said support frame members, each rigidly mounted to the free end of a corresponding one of said first levers;
- a pair of second levers, each having substantially said first length and pivotally mounted on a respective one of said second pivots;

a pair of front arms, each rigidly mounted at an intermediate point to the free end of a respective one of said second levers;

a pair of linkages, each having a first end pivotally connected to a respective one of said front arms at a point a second length above said intermediate point and a second end pivotally connected to a corresponding one of said lateral sides of said back support at substantially said second length above said mounting point for the corresponding one of said first levers;

a pair of extendable chair seat supports, each proximate to a respective one of said support frame members, each comprising a first and second portions which slideably engage



one another with the free end of said first portion pivotally connected to a corresponding one of said lateral sides of said back support at a third length below said mounting point for the corresponding one of said first levers and with the free end of said second portion pivotally connected to a corresponding one of said front arms at a fourth length below said intermediate point, said third length being greater than said fourth length;

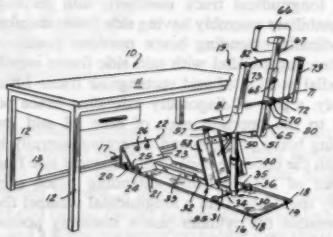
whereby a chair seat supported by said pair of extendable seat supports, will assume a comfortable angle with respect to the horizontal when the chair is in a seating position, and will assume a horizontal position coplanar with the back of the chair when the chair is in a stretcher position.

4,046,419

SWIVEL CHAIR

Karl Schmitt, Rangstrasse 39, 64 Fulda, Germany

Filed Apr. 14, 1976, Ser. No. 676,680
Claims priority, application Germany, Apr. 21, 1975, 2517578
Int. Cl.[2] A47B *83/02*
U.S. Cl. 297—153 11 Claims



1. A swivel chair assembly comprising, in combination:

an elongate, flat baseplate with raised longitudinal edges and a front portion adapted to be captured beneath a horizontal traverse of a work station fixture;

a hollow, rectangular guide tube affixed longitudinally to said baseplate adjacent the front portion thereof and having an opening to the rear;

an undercarriage means for supporting said chair upon said baseplate, comprising:

a rectangular guide bar receivable telescopically on bearings in said guide tube and extending longitudinally of said baseplate,

an axle portion received on a rear end of said guide bar and extending transversely of said baseplate between said raised edges thereof, and

a roller received rotatably on each end of said axle portion inwardly of said raised edges of said baseplate and oriented to rotate as said undercarriage is translated along said baseplate;

first and second telescopable columns, said first column being carried on said undercarriage at the rear end of said guide bar and extending vertically therefrom, and said second column being received rotatably in said first column and being adjustable vertically with respect thereto;

chair means having a backrest portion and a seat portion carried on an upper end of said second telescopable column;

a transverse tube on an upper end of said second column, the tube having ends pivotally connected to said chair means;

said backrest portion spaced from and parallel to said transverse tube,

said backrest portion including a longitudinal tube affixed thereto and a pivotable axle transversely connected thereto; and

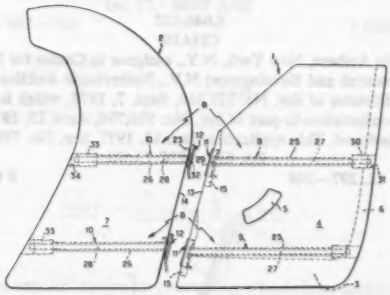
said axle having stop means limiting its pivotable orientation and carrying an armrest on either end thereof for selective storage in a substantially vertical position and use in a forwardly-pivoted position parallel to said seat portion of said chair means.

4,046,420

CHILD'S SAFETY CHAIR

Olivier de la Taille, Etampes; Armand Bernard, Mespuits, and Jean-Francois Labadie, Etampes, all of France, assignors to Societe Industrielle Bertrand Faure, Etampes, France

Filed Nov. 7, 1975, Ser. No. 630,048
Claims priority, application France, Nov. 18, 1974, 74.37989
Int. Cl.[2] B60R *21/00*
U.S. Cl. 297—216 7 Claims



1. A child's safety seat comprising: a seat body part adapted to be firmly connected to a vehicle seat; a child-retaining means, the side walls of which bear against the side walls of the seat body part; and energy-absorbing means interposed between the seat body part and the retaining means for protecting a child in the seat in the event of sudden deceleration of the vehicle, said energy-absorbing means comprising at least two similar assemblies, each of which includes two energy-absorbing members, one of which members is housed in a side wall of the seat body part and the other in the corresponding side wall of the child-retaining means, each of said two members being

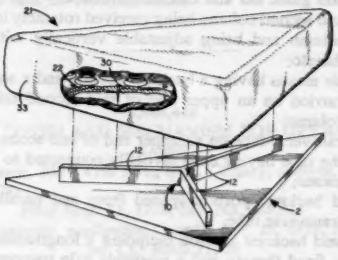
provided with coupling means for coupling them together and said coupling means being located at the bearing faces of the associated side wall of the seat body part or child-retaining means.

4,046,421

MODULAR ARTICLE OF FURNITURE

Albert M. Spound, Boston, and Robert C. Day, Princeton, both of Mass., assignors to Charlton Company, Inc., Leominster, Mass.

Filed Apr. 21, 1976, Ser. No. 678,961
Int. Cl.² A47C 15/00
U.S. Cl. 297—232 14 Claims



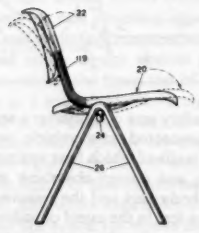
1. A modular article of furniture comprising:
a base of predetermined geometric configuration;
a seat support of predetermined geometric configuration;
means for supporting said seat support above said base in confronting spaced relationship to define a continuous, predetermined gap between the upper peripheral edge of said base and the lower peripheral edge of said seat support;
at least one upper body support having a lower support member;
means for supporting said seat support configured to allow selective insertion of said lower support member of said upper body support into said continuous, predetermined gap at any one of a plurality of positions along the peripheral edge of said base; and
means within said gap for releasably securing said lower support member to said base.

4,046,422

CHAIR

Emilio Ambasz, New York, N.Y., assignor to Center for Design Research and Development N.V., Netherlands Antilles

Division of Ser. No. 721,164, Sept. 7, 1976, which is a continuation-in-part of Ser. No. 586,794, June 13, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 759,077
Int. Cl.² A47C 15/00
U.S. Cl. 297—248 8 Claims



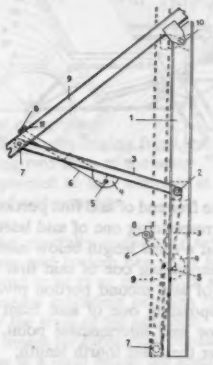
1. A chair adapted to be ganged in coupled relation side by side with similar chairs comprising a seat, a back and a pair of armrests, each armrest being supported in cantilevered relation at one end from an armrest support in outwardly offset relation to the armrest support, the two armrests being at substantially the same vertical elevation and said one end of one of the armrests being located forward of said one end of the other armrest such that when two such chairs are ganged, adjacent armrests of the ganged chairs interlock laterally with said one ends abutting back to front and the armrests engaging inside to inside.

4,046,423

LIFTING MEMBERS FOR TRUCK BODIES AND SIMILAR UNITS

Marino Paneda Ordonez, Cª de Oviedo, Pumarin, Gijon, Spain

Filed Mar. 18, 1976, Ser. No. 667,852
Claims priority, application Spain, Apr. 3, 1975, 436287
Int. Cl.² B65G 67/30
U.S. Cl. 298—22 D 3 Claims



1. A lifting mechanism for truck bodies and the like in combination with a pair of laterally spaced longitudinal stationary frame members, a dump frame pivotally connected to said stationary frame members adjacent one end thereof, said dump frame including a pair of laterally spaced longitudinal track members disposed in a plane immediately above and parallel to the plane of said longitudinal stationary frame members, a rectangular frame lifting stabilizer assembly positioned between and spanning substantially the entire lateral distance between said stationary frame members and said track members, a pair of pivot connections connecting the inner end of said rectangular frame lifting stabilizer assembly to said pair of laterally spaced stationary frame members, a pair of connectors on the opposite end of said rectangular frame lifting stabilizer assembly engaged for sliding movement in said pair of laterally spaced longitudinal track members, said rectangular frame lifting stabilizer assembly having side frame members, a pair of longitudinally extending brace portions positioned between and extending parallel with said side frame members only at the medial portion of said rectangular frame lifting stabilizer assembly, a pair of diagonally extending brace portions connected to the opposite ends of each of said longitudinally extending brace portions and diverging laterally into connection with the opposite ends of the adjacent side frame member, said pair of longitudinally extending brace portions being laterally spaced to form a longitudinal channel therebetween, an extensible lift cylinder-piston assembly positioned in the longitudinal channel between said pair of longitudinally extending brace portions, a cross-member extending at substantially right angles between and connecting said pair of longitudinally extending brace portions and pivotally connecting one end of said extensible lift cylinder-piston assembly to a medial portion of the length of said rectangular frame lifting stabilizer assembly, a support member connected laterally of said dump frame in a longitudinal position between said cross member and said pivot connections connecting the inner end of the rectan-

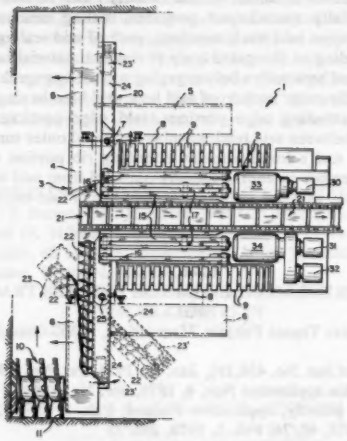
gular frame lifting assembly to said stationary frame members when the dump frame is in a horizontal position, said lift cylinder-piston assembly having a longitudinal axis diagonally intersecting the planes of said rectangular frame lifting assembly and said dump frame when the latter is in a horizontal position, and the other end of said lift cylinder-piston assembly pivotally connected to said support member, said lift cylinder-piston assembly being contained within the length of said rectangular frame lifting stabilizer assembly when the dump frame is in a horizontal position, whereby upon extension of said extensible lift cylinder-piston assembly said dump frame is moved about its pivot connection with said stationary frame members from a horizontal position to a raised dump position and simultaneously said lifting stabilizer assembly is moved about its pivot connection with said stationary frame members and carries said lift cylinder-piston assembly therewith.

4,046,424

CONTINUOUS MINING MACHINE WITH HINGED CUTTER GUIDE EXTENSIONS

Warren G. Montgomery, 2 Berwood Drive, Rte. 8, Morgantown, W. Va. 26505

Continuation-in-part of Ser. No. 647,343, Jan. 8, 1976, abandoned. This application Oct. 8, 1976, Ser. No. 731,043
Int. Cl.² E21C *35/12*
U.S. Cl. 299—56 **6 Claims**



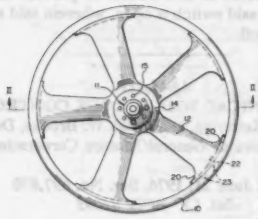
1. a continuous mining machine having a moveable carrier, a cutter head, a horizontal support guide extending across the front end of said carrier for supporting said cutter head for slideable movement thereon, a gathering conveyor extending across the front end of said carrier parallel to and beneath said support guide, and a flight conveyor extending over the length of said carrier to convey material received from said gathering conveyor; the improvement comprising in that a guide end portion of said support guide is adapted to extend over a side edge of said carrier, and in having a guide hinge with a pivot point positioned beyond the side edge of said carrier for supporting said guide end portion whereby said guide end portion may be moved from a position extending across the carrier to a position extending along a side of the carrier.

4,046,425

WHEEL

Manuel Domingos Sardinha, 337 Palmerston Blvd., Toronto, Canada

Filed Oct. 3, 1975, Ser. No. 619,208
Claims priority, application Canada, June 30, 1975, 230514
Int. Cl.² B60B *23/00*
U.S. Cl. 301—12 R **1 Claim**



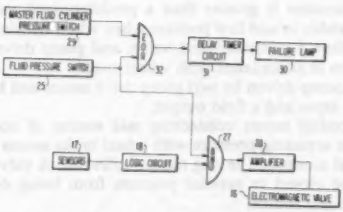
1. A bicycle wheel, comprising a metal rim of radially outwardly open, generally U-shaped cross-section, a central portion extending around a hub, a plurality of spoke portions extending radially outwardly from the central portion to the rim, each of the spoke portions having a closed, hollow transverse cross-section, a plurality of curved metal strips contiguous with the inner periphery of the rim, the strips being secured to the radially outermost ends of the spoke portions within the spoke portions, and a plurality of releasable threaded fasteners securing the rim to the curved metal strips, said threaded fasteners extending radially inwardly through said rim into threaded engagement with said metal strips, the central portion and the spoke portions each being formed of two halves joined together in a plane transverse to the axis of the hub of the wheel, and each half of the central portion being integral with a respective half of each of the spoke portions, and the central portion and the spoke portions being made of lightweight metal.

4,046,426

ANTISKID DEVICE

Katsuya Miyake, Ageo, Japan, assignor to Akebono Brake Industry Co., Ltd., Nihonbashi, Japan

Filed Feb. 5, 1976, Ser. No. 655,598
Int. Cl.² B60T *8/02*
U.S. Cl. 303—100 **3 Claims**



1. In an antiskid device for preventing wheels from skidding, said device being of the type having, sensor and logic means for developing a braking pressure reducing signal when said wheels are in a skid condition, a braking system having a master cylinder and wheel cylinders for applying braking pressure to said wheel cylinders, a modulator for reducing the braking pressure to said wheel cylinders when actuated, the improvement comprising, pressure sensor means responsive to the braking pressure at said wheel cylinders for providing a braking pressure minimum signal when the braking pressure in said wheel cylinders is above a predetermined minimum which is set nearly at zero where the braking pressure will be ineffective, and circuit means responsive to said braking pressure

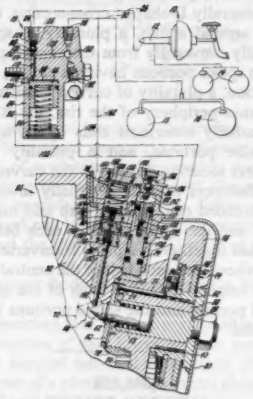
reducing signal and said braking pressure minimum signal for actuating said modulator only when both said signals are in coincidence, said pressure sensor means comprising a pressure switch actuated when said minimum pressure is exceeded, and said circuit means comprising a transistor having base, collector, and emitter electrodes, said base being connected to receive said braking pressure reducing signal, and said collector and emitter forming an output circuit in combination with a control coil for said modulator, said pressure switch being electrically connected in said circuit to prevent actuation of said circuit when said switch is open, wherein said switch is in series with said coil.

4,046,427

MECHANICAL WHEEL LOCK CONTROL

Gene P. Baynes, Kettering, and Frank W. Brooks, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed June 21, 1976, Ser. No. 697,870
Int. Cl.² B60T 8/093
U.S. Cl. 303—115 1 Claim



1. A wheel lock control system in a vehicle having wheel means to be braked and a source of brake actuating pressure, said system comprising:

drive mechanism responsive to wheel deceleration and acceleration and including first control means actuatable from a first position to a second position while wheel deceleration is greater than a predetermined value and actuatable to said first position when wheel deceleration is less than a predetermined value, and pump drive means driven in accordance with wheel speed;

a fluid pump driven by said pump drive means and having a fluid input and a fluid output;

first conduit means connecting said source of controlled brake actuating pressure with wheel brake means for said wheel means and having therein a first check valve spring biased closed to prevent pressure from being delivered from said source;

first valve opening means normally holding said first check valve open;

a fluid pressure accumulator having a pressure movable spring biased wall therein having an uncharged position and movable by fluid pressure to a charged position, said wall being operatively connected to said first valve opening means to allow movement thereof as said wall moves toward the charged position to permit said first check valve means to close, and upon return of said wall to said uncharged position moving said first valve opening means to open said first check valve;

a normally closed second check valve and a first restrictive orifice in fluid series and connecting said pump output with said first conduit means intermediate said first check valve and said wheel brake means, said second check valve permitting fluid flow only from said pump to said first conduit means;

second conduit means fluid connecting said pump input with said first conduit means intermediate said first check valve and said wheel brake means;

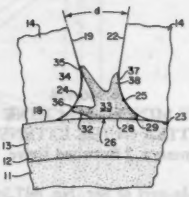
a restrictive orifice — surge dashpot permitting fluid flow therethrough and a third check valve in series therewith said orifice — dashpot and third check valve being in said second conduit means, said third check valve being biased closed to prevent fluid flow from said first conduit means and said orifice — dashpot to said pump input.

4,046,428

TRACTION SHOE SEAL

John R. Baner, North Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 646,437
Int. Cl.² B62D 55/24
U.S. Cl. 305—11 8 Claims



1. A removable track for an annular resilient tire comprising an annular belt having a radially outer surface, a plurality of track members mounted on said radially outer surface at circumferentially spaced-apart positions, sealing members disposed between said track members, each of said sealing members including an elongated body of resilient material having a longitudinal base with a belt-engaging surface engageable with said radially outer surface of said belt, said base having transversely extending edge portions, said edge portions being disposed between said track members and said outer surface of said belt, and a longitudinally extending rib portion of said sealing member extending radially outward from said base for engagement with the surface of at least one of said track members.

4,046,429

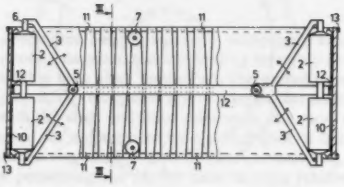
STEERING MECHANISM FOR ENDLESS TRACK VEHICLES

Jorma Tolvo Tapani Pohjola, Haravatie 6, 90530 Oulu 53, Finland

Division of Ser. No. 438,191, Jan. 31, 1974, Pat. No. 3,934,664.
This application Nov. 4, 1975, Ser. No. 628,773
Claims priority, application Finland, Feb. 1, 1973, 292/73; Jan. 7, 1974, 40/74; Feb. 1, 1973, 293/73
Int. Cl.² B62D 55/24
U.S. Cl. 305—35 EB 9 Claims

1. In a vehicle, endless elongated track means extending longitudinally in the general direction of the travel of the vehicle for assuming at either one of a pair of opposed side regions of the endless track means a contracted condition while assuming an expanded condition at the other side region when executing turns with the side region which contracts and the side region which expands being determined by the direction of turning and with said endless track means assuming in its entirely a curvature corresponding to the direction of turning of the vehicle, a pair of end roll means partially surrounded by and engaging said endless track means at opposed ends thereof for guiding said endless track means during travel of the vehicle with turns of the vehicle being brought about by turning of at least one of said end roll means about an upright

axis, and length-limiting means forming part of said endless track means for limiting the arcuate lengths of those portions of said endless track means which at any given instant extend around said pair of end roll means for engaging said end roll means with portions of said endless track means which do not slip with respect to said end roll means and in effect form substantially rigid entities therewith, said track means assuming said contracted and expanded conditions with its own inherent structure, said length-limiting means including an elongated substantially non-stretchable endless band extending centrally along and fixed to said endless track means substantially midway between said opposed side regions thereof to provide said endless track means with taut arcuate portions extending around and engaging said end roll means, said non-



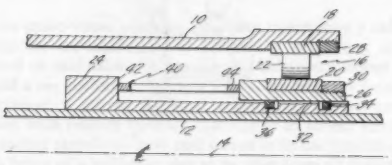
stretchable band being flexible in a substantially vertical plane for conforming with the remainder of said endless track means to the curvature of said end roll means, said endless track means including transversely extending elongated track elements having central portions fixed to said band which forms said length-limiting means, said transversely extending track elements each having opposed elongated edge regions extending transversely of said track means and respectively overlapping preceding and following track elements and said overlapping track elements engaging each other at opposed edge regions thereof at the arcuate portions of said track means which at any given instant extend around said pair of end roll means for contributing to the rigidity of the endless track means at its portions which extend around the end roll means.

4,046,430

DAMPED INTERSHAFT BEARING AND STABILIZER

Dennis F. Buono, East Hartford; Nils G. Carlson, Glastonbury; David H. Hibner, Colchester, and Donald C. Moringiello, Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 12, 1976, Ser. No. 666,530
Int. Cl.² F16C *35/08*
U.S. Cl. 308—26 **11 Claims**



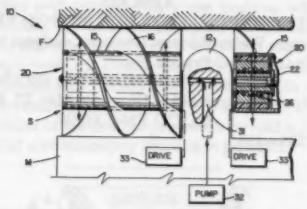
1. Damping means for an inner shaft and outer shaft mounted in coaxial relation, bearing means mounted between said inner shaft and said outer shaft, a fluid damper mounted under the bearing and includes an annular groove surrounding at least one of said shafts which is filled with a viscous fluid, radial restraint means mounted on said one of said shafts in parallel with the viscous damper means to impart a load to the other of said shafts to change its critical speed to a value above the maximum rotational speed of said one of said shafts and stabilize the viscous damper.

4,046,431

WATER LUBRICATED BEARING ASSEMBLY FOR MINING MACHINE

Robert D. Harris, Delmont, Pa., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Sept. 10, 1975, Ser. No. 611,952
Int. Cl.² F16C *37/00*
U.S. Cl. 308—76 **10 Claims**



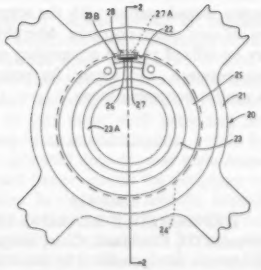
1. A water lubricated bearing assembly and rotary water joint for a rotary drilling tool comprising: a shaft, an inner and an outer race located concentrically about said shaft and having respective annular bearing surfaces, annular channel means formed between said races to confine a flow of lubricating water in a single stream, at least one bearing member confined in said channel means, a water passageway formed within said shaft and communicating with said channel members, means to supply a pressurized flow of water through said passageway and said channel means sufficient to lubricate said bearing member, and to establish a flow of water to said channel means via said passageway, and transfer means in communication with said channel means to drain the water radially outwardly from said bearing assembly and feed the same to the drilling face of the tool, whereby lubrication, tool cooling function and transfer of water to the drilling face may be combined from a single stream of water.

4,046,432

BEARING ASSEMBLY AND ANCHOR THEREFOR

Charles J. Hofmann, and Frederick F. Suess, both of Lancaster, Pa., assignors to Fidelity Electric Company, Incorporated, Lancaster, Pa.

Filed June 9, 1976, Ser. No. 694,364
Int. Cl.² F16C *19/14*
U.S. Cl. 308—189 R **7 Claims**



1. A bearing assembly comprising:
a bearing bracket housing,
a bearing means having a bearing race fitted in said bearing bracket housing,
means for retaining said bearing means within said housing,
and means for anchoring said bearing race to said housing so as to prohibit relative motion therebetween while permitting limited axial movement therebetween,
wherein said anchoring means comprises,

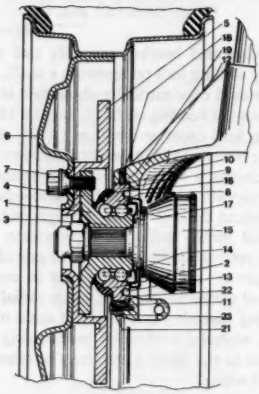
an axial notch formed on said race,
an anchor plate fitted in said notch,
said anchor plate having an angularly disposed tip at one end thereof,
and means for securing said tip relative to said housing.

4,046,433

WHEEL BEARING UNIT FOR MOTOR VEHICLES

Heinz Kiener, Waigolshausen, Germany, assignor to SKF Industries, Inc., King of Prussia, Pa.

Filed Mar. 22, 1976, Ser. No. 668,870
Claims priority, application Germany, Mar. 22, 1975, 2512827
Int. Cl.² F16C *33/00*
U.S. Cl. 308—191 **8 Claims**



1. In a wheel bearing unit for motor vehicles with two bearing parts which can rotate relative to one another, between which at least two rows of rolling elements are arranged, said bearing parts each having an outer flange-like portion, a first of said outer portions being fastened to said vehicle, the other of said outer portions being fastened to said wheel, the improvement comprising a screw thread formed on an outer periphery of said first of said outer portions and running essentially axially, connecting means for connecting said first of said outer portions to said vehicle, said connecting means having a corresponding screw thread mating with the screw thread formed on said first of said outer portions, whereby said first outer portion may be affixed to said connecting means by relative rotation therebetween, and means for securing said mated connection against becoming loose.

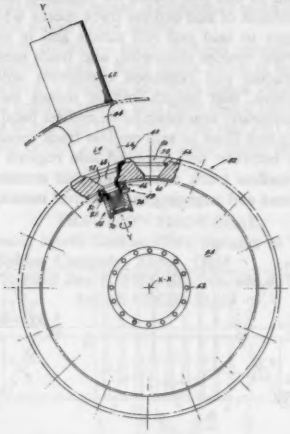
4,046,434

DEFORMABLE BEARING SEAT

Otis S. Moreman, III, Cincinnati, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 14, 1975, Ser. No. 595,747
Int. Cl.² F16C *13/00*
U.S. Cl. 308—195 **5 Claims**

1. A deformable bearing seat for seating a bearing assembly in a housing, said seat comprising:
a deformable seating surface having a predetermined spheroidally contoured surface adapted to engage a first portion of said bearing assembly when said housing is in an undeformed mode, said seating surface deformable to a predetermined spherically contoured surface adapted to



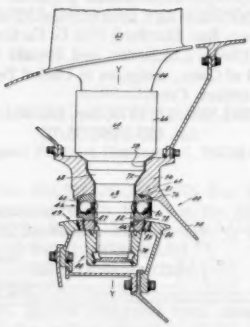
engage a second portion of said bearing assembly when said housing is in a deformed mode.

4,046,435

BEARING SEAT USABLE IN A GAS TURBINE ENGINE

Otis S. Moreman, III, Cincinnati, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 14, 1975, Ser. No. 595,745
Int. Cl.² F16C *13/00*
U.S. Cl. 308—195 **4 Claims**

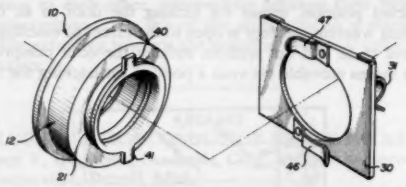


1. In combination with a gas turbine engine having a rotating blade and mounting ring assembly adapted for rotation about a first axis, the assembly including a plurality of blades, each of said blades being rotatably mounted on said ring for rotation about a second axis, said assembly further including a plurality of bearing assemblies each associated with one of said blades and disposed around the periphery of said rotating ring, the improvement comprising:
a substantially continuous seating surface on said ring, said seating surface adapted to engage and seat said plurality of bearing assemblies.

4,046,436
ARTICULATED THRUST BEARING

Villy Brown, Chicago, Ill., assignor to Aetna Bearing Company, Chicago, Ill.

Filed July 28, 1976, Ser. No. 709,327
Int. Cl.[2] F16C *19/00*
U.S. Cl. 308—233 15 Claims

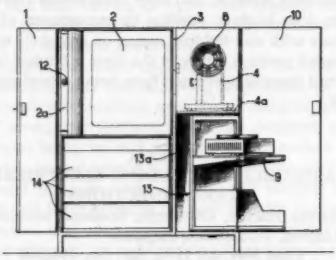


1. An articulated bearing assembly comprising at least two relatively rotatable races, and a mounting assembly for mounting the bearing on a shaft or the like, the mounting assembly including an axially elongated sleeve adapted for slidable connection with the shaft and fixed relative to one race, a carrier plate adapted for engagement by a clutch fork or the like for moving the bearing axially upon the shaft, articulating fulcrum means for permitting the carrier plate to rock relative to the sleeve about an axis perpendicular to the shaft, and retainer means for retaining the carrier plate on the sleeve in contact with the fulcrum means.

4,046,437
COMBINATION CABINET FOR AUDIO-VISUAL TEACHING

Aristide Leon Caron, and Paulette Marie Laure Caron, both of 10, rue de Limoges, 78000 Versailles, France

Filed Nov. 14, 1975, Ser. No. 632,115
Claims priority, application France, Nov. 19, 1974, 74.38044
Int. Cl.[2] A47B *81/06*; G03B *21/28*
U.S. Cl. 312—20 2 Claims

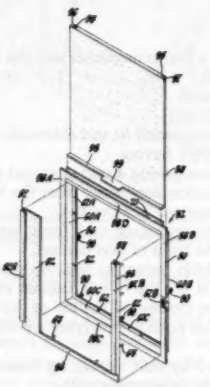


1. An audio-visual teaching apparatus comprising a cabinet, a projector mounted in said cabinet, a projecting screen mounted on said cabinet for movement between a stored position and a use position projecting forwardly from the facade of said cabinet, a mirror mounted within said cabinet and so oriented with respect to said projector as to reflect luminous rays emitted therefrom onto said screen in its use position, said screen being of a sufficient size to be seen from all points of a room such as a classroom in which the apparatus is used and being supported for pivotal movement about a vertical axis in the upper part of said cabinet for limited pivotal movement out of said cabinet to said use position to thereby increase the optical path of the luminous rays emitted by said projector and thereby increase the size of the image projected without increasing the size of said cabinet, said mirror being positioned in said cabinet so that all rays emitted from said projector pass through paths of substantially equal length to said screen in said use position, audio means including a speaker mounted within the upper portion and on the facade of said cabinet and a record player and amplifier, a console concealable in the lower portion of said cabinet and mounted for pivotal movement between a stored position and a use position, said pivotal movement of said console being about a vertical axis, said console having a facade which is in alignment with the facade of the cabinet when the console is in its stored position, said facade of the console projecting outwardly from the cabinet when the console is in its use position, said record player and amplifier and the controls therefor being mounted on said console for pivotal movement therewith between a stored position within said cabinet and a use position wherein the controls therefore are in close proximity to the controls for said projector and wherein there is provided in the rear of said console a space permitting a teacher to simultaneously operate the controls of the audio means and projector while facing the audience and remaining rearward of the facade of the cabinet so that the vision of the images projected on said screen is not obstructed and a commentary thereon is possible.

4,046,438
VERTICAL SLIDING CLOSURE PANEL FOR REFRIGERATION DOOR

Louis D. Benasutti, Fairborn; Jerry L. Neubauer, Dayton, both of Ohio, and Ronald E. Meyer, Troy, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 30, 1976, Ser. No. 718,754
Int. Cl.[2] A47F *3/00*; E06B *3/00*
U.S. Cl. 312—138 A 3 Claims



1. In a refrigerator cabinet having an insulated door for closing a compartment, said door comprising an outer shell and an inner liner with the space therebetween filled with insulation material, said door having a rectangular-shaped opening formed in said shell defining a recessed service area, a sliding panel assembly in said outer shell providing access to the service area, comprising in combination, a main frame section and a sub-frame mounted thereon, said main frame having an outwardly directed flange around the periphery of said opening, said sub-frame having a horizontally extending bottom cross member and a pair of vertically extending side members, said sub-frame section side members having outer opposed return flanges coextensive with said sub-frame side members defining vertical guide rails, a vertically sliding panel having inner L-shaped flanges on its inner face adjacent its side edges defining channels coextensive with its vertical side edges, said sub-frame guide rails positioned with their associated channels for guiding said panel during vertical movement between its lower closed position and its raised open position in which it underlies a portion of said outer shell, and a plurality of resilient sheet metal clips for positioning on said panel offset flanges, each said clip having body portion including a pair of spring biasing fingers, means on each said clip body portion

resiliently engaging one of the panel L-shaped flanges for retention thereon, the clip spring fingers each formed with an arcuate bowed portion for resiliently biased location between its associated L-shaped flange and the opposed outer surface of said sub-frame adjacent side member, whereby the clips provide smooth sliding movement of said panel in said sub-frame while imparting positioned stability thereto so that said panel can be resiliently retained in any desired vertical position.

4,046,439

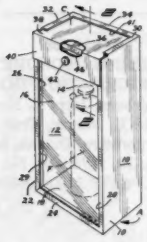
CABINET FOR A FIRE EXTINGUISHER WITH LOCKING CLOSURE MEMBER

Walter Lee, 4450 W. 78th St., Bloomington, Minn. 55435

Filed Jan. 30, 1976, Ser. No. 653,941

Int. Cl.² A62C *27/16*; A47B *96/06*; B65D *25/54*

U.S. Cl. 312—138 R **3 Claims**



1. A cabinet for a fire extinguisher and the like comprising:
a. a first sidewall,
b. a second sidewall,
c. a bottom wall, and
d. a back wall, connected to said sidewalls
e. a closure member having
f. a flat top portion having a rear edge and a front edge and
g. a flat front portion depending from the front edge,
h. a partial transparent front wall,
i. means slidably mounting said front wall between said sidewalls at the front of said cabinet,
j. means for slidably mounting said top portion of said closure member at the top of said cabinet to a position with the top portion closing off the top of the cabinet and said depending front portion overlying a portion of said front wall, and
k. a lock carried by said depending front portion of said closure member engageable with
l. means carried by said cabinet.
m. said means for slidably mounting said top portion of said closure member includes a slotted supporting structure into which said closure member is slid, and
n. said slotted supporting structure includes spaced protrusions connected to said cabinet between which said top portion of said closure member slides.

4,046,440

VENDOR WITH DOOR AND SHELF INTERLOCK

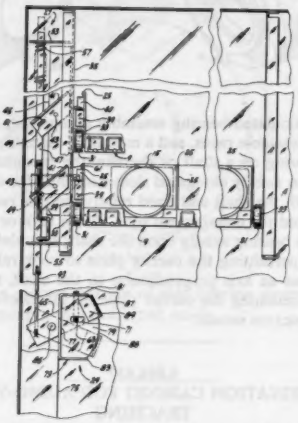
Robert N. Cox, Bridgeton, and Melvin G. Grober, Mountain Grove, both of Mo., assignors to UMC Industries, Inc., Stamford, Conn.

Continuation of Ser. No. 511,986, Oct. 4, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,215

Int. Cl.² A47F *1/00*; G07F *11/00*

U.S. Cl. 312—215 **10 Claims**

1. In a vendor comprising a cabinet having a front door, a plurality of shelves in the cabinet for holding items to be vended, each shelf being mounted for sliding movement in rear-to-front direction for being slid out from a vending position within the cabinet to a loading position extending forward from the cabinet when the door is opened, and means for dispensing items from the shelves: means for locking the shelves in said vending position within the cabinet comprising latch means movable between a position for latching the shelves in said vending position and a retracted position freeing the shelves to be pulled out, holding means on each shelf engageable by the latch means when the shelf is pulled out to any extended position within a predetermined range of extension from its vending position for holding the latch means in retracted position, means for locking the door in an open position wherein the door is open to the extent of enabling the shelves to be slid out without striking the door comprising latch means movable between a position for latching the door



in its said open position and a door unlatching position, said shelf latch means and said door latch means being so interconnected for movement one with the other that the shelf latch means must move out of its said retracted position toward its shelf latching position for the door latch means to move to its door unlatching position, said door latch means thereby being held in its door latching position by engagement of the shelf latch means with said holding means on any shelf which is in said extended position whereby the door is latched in its open position and thereby prevented from being closed and striking said shelf.

4,046,441

ASSEMBLIES INCLUDING ELECTRICAL INTERCONNECTIONS

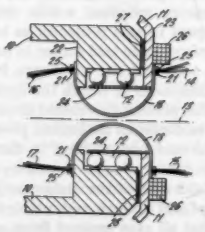
David Murray Harley, Edinburgh, Scotland, assignor to Ferranti Limited, Hollinwood, England

Filed Nov. 23, 1976, Ser. No. 744,348

Claims priority, application United Kingdom, Nov. 26, 1975, 48699/75

Int. Cl.² H01R *39/00*

U.S. Cl. 339—8 R **15 Claims**



1. An assembly including two members capable of limited relative rotation about a common axis and an electrical inter-

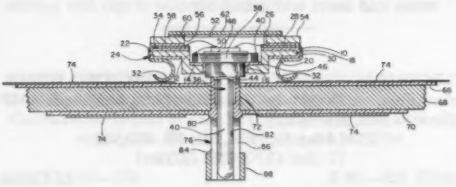
connection at least including a flexible conductor strip secured to two positions, one on each of the two members, and spaced from the common rotational axis, in relation to the axis of the strip extending between said securing positions on the two members, the strip having a mean width greater than its thickness, and with the members at one particular orientation in relation to each other, intermediate between their limits of relative rotation, the axis of the strip lying in a plane and wholly extending towards the common rotational axis of the members.

4,046,442

PLUGGABLE SEMICONDUCTOR DEVICE PACKAGE

Robert V. Hutchison, Oceanside, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Division of Ser. No. 575,180, May 7, 1975, Pat. No. 3,984,166.
This application May 3, 1976, Ser. No. 682,311
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 CF **2 Claims**



1. An assembly for a semiconductor device which provides excellent heat dissipation and which is readily connectable without requiring intermediate connectors or soldering, said assembly comprising in combination:

a substrate having an upper major surface, side portions, and a lower surface, said substrate having an opening therein extending orthogonally to the major surface;

a thermally conductive stud mounted in the substrate opening, said stud having an upper end face for receiving a semiconductor device and lower body portions extending from the substrate lower surface;

a semiconductor device mounted on said stud face;

a conductive lead frame having a plurality of mutually spaced finger members, each finger member having integral inner, intermediate, and outer portions; said inner portions being on said substrate upper surface and converging on said openings, said intermediate portions being on said substrate upper surface and radially extending from said inner portions towards the side portions of the substrate, said outer portions extending around said substrate side portions and forming spring contacts projecting from the lower surface of the substrate;

said semiconductor device being electrically connected to the inner portions of the lead frame finger members;

means for covering said semiconductor device, said means being attached to said substrate upper surface so that the lead frame inner portions are enclosed while leaving the outer portions unenclosed;

a printed circuit board having upper and lower insulative layers with a metallic layer interdisposed therebetween, said circuit board having a plurality of conductors corresponding with said spring contacts on at least an outer surface of the upper layer, said circuit board having an aperture therein extending through said layers for receiving a receptacle;

a metallic annular receptacle mounted in said circuit board aperture and having outer side walls contacting said metallic layer in the circuit board, said receptacle extending below the circuit board and including a longitudinal bore therein for receiving the body portion of the stud;

said stud body portion being removably secured in the bore of the receptacle to thereby engage said spring contacts with the corresponding conductors on the circuit board; and

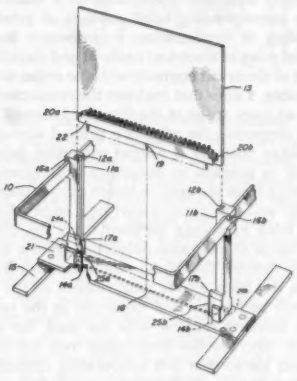
a ferrule of thermally deformable material surrounding the receptacle below the circuit board for clamping said receptacle securely around the stud body portion to thereby prevent any movement which may deleteriously effect the electrical connection between the spring contacts and their corresponding circuit board conductors.

4,046,443

PRINTED CIRCUIT CARD GUIDE

Patrick Joseph Champagne, Edina, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed May 27, 1976, Ser. No. 690,698
Int. Cl.[2] H01R *13/20*; H05K *1/04*
U.S. Cl. 339—66 M **10 Claims**



1. An improved card rack/circuit card assembly allowing easy insertion and removal of individual circuit cards, comprising

a. a frame including first and second parallel spaced-apart members;

b. a circuit card having a connector end carrying a plurality of spaced-apart electrical contacts, and side edges intersecting the leading edge and spaced from each other a distance less than that separating the frame's parallel spaced-apart members;

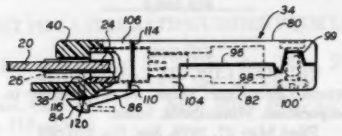
c. a connector block adapted to mate with the card's electrical contacts and form electrical connection with the contacts;

d. first and second card guides each having first and second ends and a slot adapted to receive a card edge, and at least one guide having a guide surface adjacent the second end and facing the direction of the adjacent slot, said first and second card guides attached at their first ends respectively to the first and second parallel spaced-apart members and each attached to an end of the connector block at their second end in facing slot relationship in a precise preselected position and spaced to allow the card to enter both slots and slide connector end first into mating position with the connector block, said guide surface positioned to engage a portion of the card connector end prior to initial engagement of the contacts in the connector block and the circuit card connector end, and constrain the connector end of the card to a precise predetermined path during a portion of its travel preceding its arrival at its final mating position, said guide further including a ramp surface faired into the guide surface end nearer the first end of said guide, said ramp surface sloping generally away from the opposing guide and toward the first end of said guide.

4,046,444
CONNECTOR FOR USE WITH PRINTED WIRING CIRCUITS

William J. Brorein, Whippany, N.J., assignor to General Cable Corporation, Greenwich, Conn.

Filed Oct. 14, 1975, Ser. No. 622,064
Int. Cl.[2] H01R 13/54; H05K 1/07
U.S. Cl. 339—91 R 10 Claims

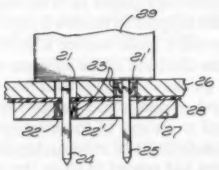


1. An electrical cable connector for connecting a multiplicity of separately insulated conductors, of a multi-conductor cable, to the corresponding edge contacts of printed wiring cards, including in combination a connector body which houses parallel rows of electrical contacts and circuits connecting said rows of electrical contacts with the respective conductors of said cable, a shell that encloses the connector body, the shell having an open space at the front end thereof for admitting into the connector the edge of a printed wiring card that carries said edge contacts, a tongue extending forward from the connector in position to cooperate with complementary means extending from the card to insure proper polarization of the connector and the contact carrying edge of the wiring card, and a latch extending forward from the connector in position to engage an extension projecting from a wiring card, an attachment forming the latch to the connector by structure that yields as the latch moves with respect to the connector when the latch passes the said extension as the connector is brought into working relation with the card, the attachment being resilient whereby the latch snaps over the back of the extension when the tongue is in cooperating relation with said complementary means of the wiring card for securing the connector to the wiring card with the edge contacts of the printed wiring cards in engagement with the contacts in the connector body.

4,046,445
SPRING BUSHING FOR CONDUCTIVE BACK-PLANE CONNECTION

John W. Anhalt, Orange, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,822
Int. Cl.[2] H01R 9/06
U.S. Cl. 339—95 D 6 Claims



1. A bushing for providing electrical and mechanical contact between an elongated conductive terminal member and a bore in a conductive plate member through which said terminal member passes, comprising:

a generally cylindrical, relatively thin-walled first member of a conductive material having a substantial spring characteristic, said cylindrical first member being open at its opposite ends;

a generally coaxial re-entrant portion integral with one end of said first member, said re-entrant portion extending axially within said first member toward the other end thereof for a distance at least part of the axial length of said first member and having an elbow in axial cross-section at said one end corresponding to the inward bend of said re-entrant portion, said re-entrant portion including a second generally cylindrical portion extending from said elbow within the inside of said first member;

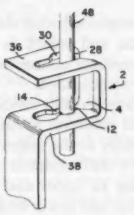
a plurality of spring fingers formed by axially slotting said re-entrant portion through the material thickness, said spring fingers rooting at said elbow and having a rest position radially inward from the inside surface of said first cylindrical member, said spring fingers being capable of resiliently deflecting radially outward against the surfaces of a terminal member axially inserted through said bushing; and

means including at least one axially extending open cut extending throughout at least the axial length of said first member, the width of said cut being reduced when said bushing is inserted in said bore, the resilience of said material providing radially outwardly acting force to tend to retain said insert within said bore.

4,046,446
ELECTRICAL TERMINAL FOR JOINING TWO WIRES

Robert Philmore Reavis, Jr., Statesville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 13, 1976, Ser. No. 685,963
Int. Cl.[2] H01R 13/38
U.S. Cl. 339—99 R 10 Claims



1. An electrical terminal for establishing a resilient electrical contact with two locally parallel and adjacent wires, said terminal comprising:

first and second spaced-apart slots, each slot being defined by adjacent linear surfaces on an integral metallic terminal member,

a relatively narrow contact slot section adjacent the top in said first slot and a similar contact slot section adjacent the bottom of said second slot, and

a relatively wider slot section adjacent the bottom of said first slot and a similar relatively wider slot section adjacent the top of said second slot, whereby positioning said two wires, one above the other, in both slots results in the primary electrical contact with said top wire being formed by said first slot and the primary electrical contact with said bottom wire being formed by said second slot.

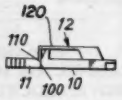
4,046,447
CONTACT DEVICE

Jan Ake Sigfrid Petersson, Solna, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 5, 1975, Ser. No. 629,099
Claims priority, application Sweden, Nov. 26, 1974, 7414824
Int. Cl.[2] H01R 13/58
U.S. Cl. 339—103 M 2 Claims

1. A connector comprising a planar shell (10) of insulating material, a plurality of adjacent and parallel contact pins (21) fixed in said planar shell, each of said pins extending beyond a first edge (100) of said planar shell, a cap (11), one end of said cap being provided with a plurality of open-through passageways (312) for accommodating said contact pins, a first edge

(110) of said cap abutting said first edge of said planar shell, one of said first edges being provided with cutouts for exposing along the abutting region a portion of each contact pin whereby access is provided for attaching signal leads to said contact pins, the ends of said through passageways remote from said first edges being open wherein electrical connections



can be made via said passageways to said contact pins, said cap having a flexible clamp member (12) extending from said first edge of said cap displaced from and parallel to said plane shell in a direction opposite to said contact pins, and interengaging means near the end of said flexible clamp member and said plane shell remote from said contact pins for removably connecting said cap to said plane shell.

4,046,448

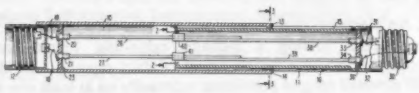
LIGHTING FIXTURE ACCESSORY

Keith G. Miller, 88 Carroll St., Binghamton, N.Y. 13902

Continuation-in-part of Ser. No. 497,654, Aug. 15, 1974. This application Nov. 11, 1975, Ser. No. 631,194

Int. Cl.[2] F21V *21/12, 21/22*

U.S. Cl. 339—153 **2 Claims**



1. A lighting fixture accessory device extensible to various lengths comprising:

an inner tubular housing and an outer tubular housing of predetermined length, said inner tubular housing being of such diameter as to telescopingly fit within said outer housing, said outer housing terminating at a first end in at least two spaced, inwardly extending lips, said lips being slidably retained in at least two grooves extending longitudinally from a first end of said inner housing, along a portion of said inner housing, said lips and grooves cooperating to prevent relative rotation of said inner and outer housings during telescoping movement thereof;

an outwardly extending threaded standard male fitting adapted to fit a standard electrical receptacle extending from a second end of one of said tubular housings;

a standard female threaded electric socket extending outwardly from a second end of said other housing and connectable to the male fitting of a similar accessory device whereby a plurality of such devices may be releasably coupled together;

electrically conductive interconnections within said inner and outer telescoping housings extending between said fitting and said socket, said interconnections comprising a first pair of rectangular metallic bars affixed at one end in a cantilever manner to an insulated support adjacent said fitting, said first bars having free ends and extending in parallel relation within one of said housings, and a second pair of rectangular metallic bars affixed at one end in a cantilever manner to an insulated support adjacent said receptacle, said second bars having free ends and extending in parallel relation within the other of said housings, said first bars each having their free end portions formed into a sleeve for sliding contact with one of said second bars, said electrical interconnection being prevented from losing contact with each other during rotation of said device due to said cooperation of said lips and grooves.

4,046,449

SYSTEM FOR INTERCHANGEABLE ATTACHMENT OF ELECTRICAL EQUIPMENT

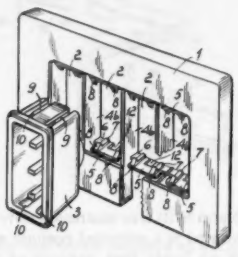
Pierluigi Ranzanigo, Via Cave 68, Brescia, Italy

Continuation of Ser. No. 605,177, Aug. 15, 1975, abandoned, which is a continuation of Ser. No. 428,405, Dec. 26, 1973, abandoned. This application Oct. 28, 1975, Ser. No. 626,561

Claims priority, application Italy, Dec. 29, 1972, 33882/72

Int. Cl.[2] H01R *13/54*

U.S. Cl. 339—126 R **9 Claims**



1. A system for interchangeable mounting of electrical equipment, comprising a mounting plate having a front and rear surface and bounding an aperture extending between said surfaces; at least one item of electrical equipment including an electrically insulating frame insertable into said aperture in direction from said front to said rear surface; and means for guiding said frame during the insertion thereof and for releasably arresting the same in a fully inserted position thereof, including at least one pair of long and one pair of short walls which are rigid with said mounting plate and extend rearwardly from said rear surface thereof to bound with one another at least one cavity constituting a continuation of said aperture, at least one detent projection rigid with each of said short walls and extending therefrom into said cavity, and at least one pair of elongated grooves on opposite sides of said frame in positions corresponding to those of said detent projections and parallel to said direction of insertion, each of said grooves having a leading guiding portion of a first depth, and a trailing detaining portion of a second depth exceeding said first depth, said short walls being resiliently yieldable to be deflected by said frame upon contact thereof with said detent projections during the insertion so that said detent projections enter said guiding portions of said grooves to guide said frame in said direction of insertion and snap into said detaining portions upon juxtaposition therewith in said fully inserted position to thereby prevent undesired extraction of said frame from said aperture of said mounting plate.

4,046,450

ELECTRICAL TERMINAL WITH RETRACTED LATCH AND ELECTRICAL CONNECTOR HAVING SAME

John A. Yurtin, Southington, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 3, 1976, Ser. No. 738,462

Int. Cl.[2] H01R *9/08*

U.S. Cl. 339—217 S **4 Claims**

1. An electrical terminal for:

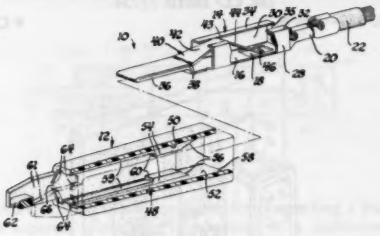
a connector body having a longitudinal cavity having a rearward opening for receiving the electrical terminal and retaining the same in the cavity which is defined in part by a pair of laterally spaced longitudinal walls, one wall of which has means providing a forward facing latch shoulder for cooperative engagement with a projecting latch portion of the terminal,

said electrical terminal comprising a floor portion having an aperture extending therethrough, and a smooth projectionless bottom surface, and

a resilient latch arm extending rearwardly in cantilever

fashion from support means at the forward end of said floor portion,

said latch arm having a forward portion diverging away from said floor portion in the rearward direction, a rearward portion extending toward said floor and a latch portion at its free end which is aligned with said aperture,



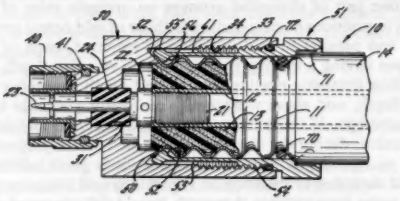
said latch arm in its free unstressed state having said latch portion located in a retracted position whereat said latch portion is no lower than portions of the floor portion adjacent the aperture therethrough, and said forward portion of the latch arm having an exposed upper surface for moving said latch arm to a position whereat said latch portion projects below the floor portion.

4,046,451

CONNECTOR FOR COAXIAL CABLE WITH ANNULARLY CORRUGATED OUTER CONDUCTOR

Richard C. Juds, Dolton, and Dennis M. Healy, Oak Lawn, both of Ill., assignors to Andrew Corporation, Orland Park, Ill.

Filed July 8, 1976, Ser. No. 703,462
Int. Cl.[2] H01R *17/18*
U.S. Cl. 339—177 R **14 Claims**



1. A connector assembly for a coaxial cable having an annularly corrugated outer conductor, said connector assembly comprising the combination of

a. a first unitary clamping member adapted to fit over the end of the coaxial cable and forming an inwardly extending bead at one end thereof for meshing with the last valley in the corrugated outer conductor and thereby locking the clamping member to the cable in the axial direction,

said bead forming a first conically beveled clamping surface for engaging the outer surface of the last crest in the corrugated outer conductor,

said first clamping member having a plurality of longitudinal slits formed in the beaded end thereof and extending through and beyond said inwardly extending bead to form a plurality of resilient segments that can be displaced outwardly to permit said bead to pass over the crest of the corrugated outer conductor as the clamping member is advanced longitudinally over the end of the cable, the portion of said first clamping member extending beyond the ends of said slits having an inside diameter at least as great as the outside diameter of the crests of said outer conductor so that the solid portion of said first clamping member fits over said outer conductor,

b. a second clamping member forming a second conically beveled clamping surface for engaging the inner surface of the last crest in the corrugated outer conductor of the cable,

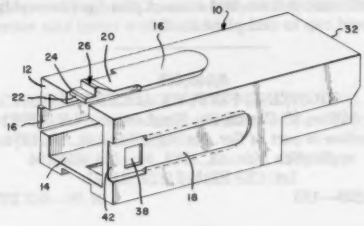
c. and means for drawing and holding the two clamping surfaces together against opposite surfaces of the outer conductor of the cable.

4,046,452

ELECTRICAL CONNECTOR HOUSING HAVING AN IMPROVED LOCKING MEANS

James William Cassarly, Lewisberry, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 16, 1975, Ser. No. 568,545
Int. Cl.[2] H01R *9/02*
U.S. Cl. 339—198 H **2 Claims**



1. An electrical connector housing, generally rectangular in cross-section, having a passage extending longitudinally through for housing an electrical contact member, an elongated dovetail tongue positioned externally on at least one side of said housing, said tongue being positioned intermediate the two ends of the housing, a notch in each said side extending from the housing rear face forwardly to the tongue, a flexible beam integral with and extending rearwardly from said tongue in alignment with the notch, said beam having an outwardly projecting boss thereon with a straight side face rearwardly, a groove positioned on at least a second side of said housing, which is opposed to said first side, extending inwardly from the housing rear face and adapted to slidingly receive a tongue on an identical housing therein, further including an opening in the floor of said groove adjacent the housing rear face, whereby

as the tongue on an identical housing slides into said groove, the flexible beam thereon becomes resiliently depressed into the notch until the boss thereon enters the opening thereby holding the two housing in the laterally assembled relation.

4,046,453

PLUG CONNECTION FOR OPTICAL FIBERS

Klaus Dieter Fiebelkorn, Niederlauterbach, France, and Gunther Spitzer, Oberweier, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

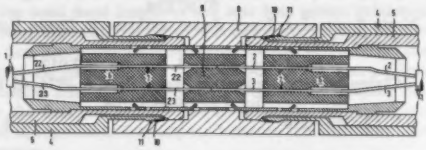
Filed June 27, 1974, Ser. No. 483,515
Claims priority, application Germany, July 5, 1973, 2334286
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96 C **4 Claims**

1. A plug connection for cables made of optical fibers, the connector being of the type having capillary tubes for accepting the ends of the optical fibers to be coupled together comprising:

a. first and second connectors each including a guide member having a plurality of longitudinal holes therein, a cable containing fibers to be connected being attached to said connector with the individual fibers inserted through said holes and supported therein in a longitudinally movable

manner, with a space provided between the point of connection of said cable to said connector and said guide member;

b. a coupling member having a plurality of longitudinal holes matching the longitudinal holes in said guide member;



c. means for coupling said first and second connectors and said coupling member; and

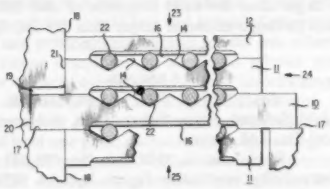
d. fiber ends protruding from each of said connectors a distance which is greater than the length assigned to them within said coupling member.

4,046,454

OPTICAL FIBER CONNECTOR

William Edward Pugh, III, Lilburn, Ga., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 18, 1976, Ser. No. 687,463
Int. Cl.² G02B 5/16
U.S. Cl. 350—96 C 6 Claims



1. Apparatus for assembling a first group of optical fibers into a fixed fiber end configuration preparatory for splicing to a second such group, comprising:

a key chip comprising:

a horizontal and a vertical reference surface;

a plurality of even-spaced, parallel fiber-receiving grooves on at least one side of said key chip, the first such groove being located a first fixed distance from the key chip horizontal reference surface and all such grooves being located a uniform distance from said key chip vertical reference surface;

a standard chip comprising:

a horizontal and a vertical reference surface;

a base including a recess;

a plurality of evenly-spaced, parallel fiber-receiving grooves on at least one side, the first such groove being located a second fixed distance from the standard chip horizontal reference surface and all such grooves being located a uniform distance from the standard chip vertical reference surface;

said second fixed distance being less than said first fixed distance; and

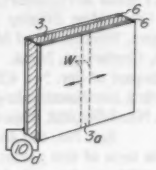
compliant means comprising compliant fiber-contacting material recessed in said base of said standard chip.

4,046,455

IRREGULAR FERROELECTRIC ELEMENT DEVISED FOR MOTION OF PLURAL DOMAIN-WALLS

Akio Kumada, Kodaira; Hiroshi Takano; Yoshizumi Eto, both of Hachioji, and Masao Hibi, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 16,199, March 3, 1970, Pat. No. 3,936,146.
This application Oct. 29, 1975, Ser. No. 626,995
Claims priority, application Japan, Mar. 15, 1969, 44-19912
Int. Cl.² G02F 1/05
U.S. Cl. 350—150 4 Claims



1. An optical slit unit which employs an irregular ferroelectric element comprising:

a crystal Z-plate of irregular ferroelectric material having a pair of opposing surfaces bounded by the sides of the plate, at least a pair of which sides opposing one another being cut in the <110> direction; and

means, coupled to said pair of opposing surfaces, for reversing the state of polarization of said plate; and wherein

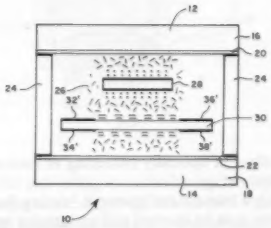
said plate has a domain configuration such that said plate includes a central nucleus-region of a prescribed polarity and two side nucleus-regions having a polarity opposite that of said central nucleus-region and being disposed on opposite sides of said central nucleus-region, with a respective domain growth wall interposed between said central nucleus-region and each of said side nucleus-regions.

4,046,456

ELECTRO-OPTIC CELL WITH TRANSVERSE ELECTRIC FIELD

Ulrich Bonne, Hopkins, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 22, 1976, Ser. No. 679,280
Int. Cl.² G02F 1/28; H01V 7/00
U.S. Cl. 350—160 R 5 Claims



1. A light controlling device comprising:

a pair of spaced transparent plates presenting a light path through said plates;

a transparent fluid suspending medium between said plates;

a plurality of elongated dipoles freely carried within the fluid medium;

first means for applying an electric field in a direction parallel to said light path to orient said dipoles parallel to said light path, thereby rendering transparent said light controlling device; and

optically transparent piezoelectric transformer means in said

fluid between said plates, and connection means from said transformer means adapted for connection to a source of electrical power for energizing said piezoelectric transformer means, said transformer means being so oriented in said fluid that when energized generating a transverse electric field and motion to orient said dipoles orthogonal to said light path to render opaque said light controlling device.

4,046,457
POLYMERIC FILM BASE CARRYING FLUOROPOLYMER ANTI-REFLECTION COATING

Edwin H. Land, Cambridge; Stanley M. Bloom, Waban, and Howard G. Rogers, Weston, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 428,368, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,979, Aug. 1, 1972, Pat. No. 3,793,022. This application Aug. 6, 1975, Ser. No. 602,462

The portion of the term of this patent subsequent to Dec. 19, 1991, has been disclaimed.

Int. Cl.² B05D *7/04, 5/06;* G02B *1/08;* B32B *27/08*

U.S. Cl. 350—164 **26 Claims**

1. A transparent element comprising an organic polymeric film base having an index of refraction of at least 1.6, said polymeric film base having coated directly on at least one surface thereof an anti-reflection coating comprising a fluorinated polymer, said anti-reflection coating having an index of refraction of about 1.3 to 1.45 and a quarter wave optical thickness, the index of refraction of said anti-reflection coating being at least 0.2 less than that of said organic polymeric film base.

4,046,458
CENTERING OF LENSES

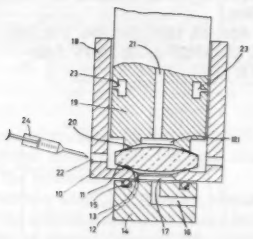
Hendricus Franciscus Gerardus Smulders, and Adrianus Jacobus Jozef Franken, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 27, 1975, Ser. No. 544,349

Claims priority, application Netherlands, Feb. 15, 1974, 7402076

Int. Cl.² G02B *7/02;* B29D *11/00*

U.S. Cl. 350—178 **9 Claims**



1. A method of optically centering at least one lens in a lens mount, comprising:

a. placing a lens mount having a bearing face against which the lens is to be located and an interior space on a centering device having means for admitting a medium under pressure to said interior space,

b. placing the lens between said bearing face and a facing bearing face of a clamping pipe having an interior space,

c. admitting a medium to the interior spaces of the clamping pipe and the lens mount respectively,

d. moving at least one of said pipe and said lens mount toward each other until a bearing gap is formed between each lens surface and the corresponding bearing face,

e. then further moving at least one of said pipe and said lens mount toward each other with a greater force than the recovery force of the bearing gap formed in step (d) so that the lens is fixed between the bearing surfaces of the pipe and the mount, and then

f. securing the lens in the mount.

4,046,459
RETROFOCUS WIDE ANGLE OBJECTIVE LENS SYSTEM

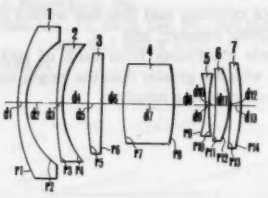
Naoto Kawamura, Inagi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1975, Ser. No. 607,915

Claims priority, application Japan, Sept. 4, 1974, 49-101709

Int. Cl.² G02B *13/04*

U.S. Cl. 350—214 **8 Claims**



1. A retrofocus wide angle objective lens system comprising seven axially aligned lenses including, in the order of the entrant light beam:

negative meniscus first and second lenses of forward convexity;

a positive third lens;

a bi-convex fourth lens;

a bi-concave fifth lens; and

positive sixth and seventh lenses; and

wherein axial air space between said third lens and said fourth lens is larger than the axial thickness of said third lens, said third lens having a diameter larger than the fourth lens.

4,046,460
OBJECTIVE FOR VIDEO DISKS

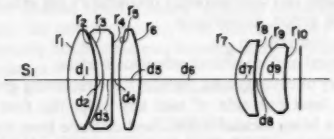
Toshimichi Koizumi, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed June 11, 1976, Ser. No. 695,037

Claims priority, application Japan, June 14, 1975, 50-72255

Int. Cl.² G02B *9/60*

U.S. Cl. 350—216 **5 Claims**



1. An objective for video disks comprising a front lens group and rear lens group, said front lens group comprising a first, second and third lens components, said rear lens group comprising a fourth and fifth lens components, said first lens component being a biconvex lens, said second lens component being a negative lens concave toward said first lens component, said third lens component being a biconvex lens, said fourth lens component being a positive meniscus lens convex toward said third lens component, said fifth lens component being a positive meniscus lens convex toward said fourth lens component, said objective for video disks satisfying the following conditions:

$$1.19 \geq d_4/f \geq 0.62 \quad (1)$$

$$3.7 \geq f_R/f \geq 2.7 \quad (2)$$
$$0.29 \geq f_R/f_F \geq 0.19 \quad (3)$$
$$0.86 \geq |r_3|/|r_2| \geq 0.6 \quad (4)$$
$$0.15 \geq d_2/f \geq 0.11 \quad (5)$$

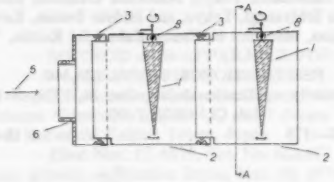
wherein reference symbol f represents the focal length of the lens system as a whole, reference symbol f_F represents the total focal length of the front lens group, reference symbol f_R represents the total focal length of the rear lens group, reference symbols r_2 represents the radius of curvature of the rear surface of the first lens component, reference symbol r_3 represents the radius of curvature of the front surface of the second lens component, reference symbol d_2 represents the airspace between the first and second lens components, and reference symbol d_6 represents the airspace between the front and rear lens groups.

4,046,461

PRISMATIC PERSPECTIVE CONTROL DEVICE

Kenneth F. Cherry, 1533 Eastgate, Toledo, Ohio 43614

Filed July 23, 1975, Ser. No. 598,333
Int. Cl.² G02B 7/18
U.S. Cl. 350—287 **2 Claims**



1. A prismatic perspective control device comprising a prism system and mounting means for said prism system providing connection to a lens and adjustment of said prism system position relative to said lens and means of ascertaining the position of said prism system relative to said lens wherein said mounting means comprises at least two tubular structures connectable to each other with slip ring interlocking means providing rotation of said tubular structures relative to each other; further each said tubular structure having means for mounting at least one prism therein and for providing independent movement of said prism within said tubular structure; one of said tubular structures is provided with means for attachment to a lens, said means for attachment comprising a third tubular structure having slip rings similar to said slip ring interlocking means between said tubular structures and a connective ring providing mounting means for connection to a lens.

4,046,462

THREE-DIMENSIONAL TRACKING SOLAR ENERGY CONCENTRATOR AND METHOD FOR MAKING SAME

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Charles G. Miller, Pasadena, and Jens G. Pohl, San Luis Obispo, both of Calif.

Filed Apr. 28, 1976, Ser. No. 681,017
Int. Cl.² G02B 5/10; E04G 11/04
U.S. Cl. 350—295 **9 Claims**

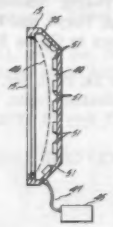
1. A three-dimensional tracking solar energy concentrator, comprising:

a support member in the form of a circular dish;

a flexible aluminized polymeric or elastomeric membrane fastened to said dish along its circular edge, forming a sealed interior;

means for creating a differential pressure in the sealed interior formed by said support member and said flexible membrane; and

means adjacent to and out of contact with said flexible membrane as shaped by the differential pressure created in the sealed interior for exerting localized filed forces at selected locations on said membrane, thereby modifying the curvature of the shaped membrane.

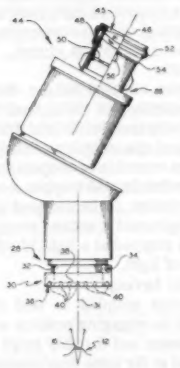


4,046,463

INDICATING AN ASPHERICITY OF THE CORNEA OF AN EYE

Joseph A. La Russa, Yorktown Heights, and Richard C. Troutman, New York, both of N.Y., assignors to Surgical Microsystems, Inc., New York, N.Y.

Filed July 17, 1974, Ser. No. 489,149
Int. Cl.² A61B 3/10; G01B 9/00
U.S. Cl. 351—13 **7 Claims**



1. Apparatus for providing an indication of an asphericity of the cornea of an eye viewed through a binocular microscope of the type used for ophthalmic surgery, comprising:

a housing adapted for connection around the head of said microscope;

a plurality of light sources connected to said housing along a circle around said head, light from said sources being transmitted to said eye; and

a rotatable reticle disposed within the focal plane of an objective of said microscope, said reticle having a pair of concentric circles whereby said asphericity is indicated by said view being of a reflection of said sources disposed along an acircular path having a portion which is not intermediate to said concentric circles.

4,046,464

EXPOSURE CONTROL SYSTEM AND A MOTION PICTURE CAMERA USING THE SAME

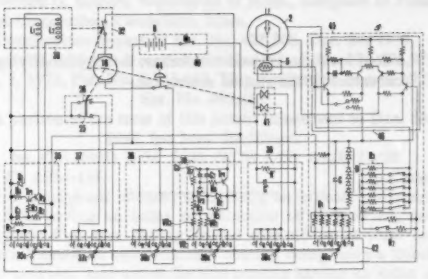
Mamoru Shimazaki, Tokyo; Masamichi Toyama, Machida; Toshikazu Ichiyanagi, Tokyo, and Hideto Iwama, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed June 20, 1975, Ser. No. 588,896

Claims priority, application Japan, June 25, 1974, 49-72656; June 25, 1974, 49-72657; July 23, 1974, 49-84433; Apr. 25, 1975, 50-50475

Int. Cl.² G03B *7/08, 21/38*

U.S. Cl. 352—141 **11 Claims**



1. A motion picture camera, comprising:

a. photographic optical system,

b. exposure adjusting means having:

an exposure correction circuit having a photoelectric conversion means to generate an electric signal corresponding to the amount of light passing through the photographic optical system, said circuit producing a signal corresponding to the output of said photoelectric conversion means, and

a diaphragm aperture means coupled to said circuit to control the amount of light passing through said photographic optical system corresponding to the output of said exposure correction circuit,

c. a rotary shutter,

d. driving means coupled to the shutter to revolve said shutter, repeatedly past the optical system,

e. switching means coupled to said driving means to control the driving and the stopping of said driving means,

f. stopper means rotatable in cooperation with the rotation of the shutter, wherein said stopper means has a first stopper to help the shutter to be stopped at a position to allow passage of light, and a second stopper means to help the shutter to be stopped at a light blocking position to block the passage of light,

g. release means having:

blocking means coupled to said switching means and shiftable to an engaging position at which it engages the stopper means and forcibly stops the revolution of the shutter and at the same time retains the switching means in an open state, and to a non-engaging position which allows rotation of the shutter and retains the switching means in a closed state, and

electromagent means coupled to said blocking means to control said shifting of the blocking means,

h. control means to control said electromagnet means, and having:

signal generating means responsive to control from without the camera and coupled to said electromagnet means to generate an electric signal for controlling the magnetization of the electro-magnet means,

first shutter position detection means coupled to said signal generating means and responsive to the shifting of the shutter to said exposure position to stop the generating of the signal from the signal generating means which causes said blocking means and said first stopper means to engage each other, said detection means having a timer circuit coupled to said signal generating means to again cause the generation of said signal by the signal generating means after a lapse of a prescribed period of time, and

photographic mode selector means switchable between an ordinary photographic mode to photograph by continuously revolving the shutter and a long time photographing mode to stop the shutter temporarily at said exposure position and expose for a long period of time, said selector means nullifying said shutter position detection means at a time of ordinary photographing, and

i. timer means to set the time of said timer circuit, said timer means being electrically connected to said timer circuit and said exposure correction circuit and controlling said timer circuit and the correction of said exposure correction circuit during the setting operation.

4,046,465

SELF-TIMER DEVICE FOR MOTION PICTURE CAMERA

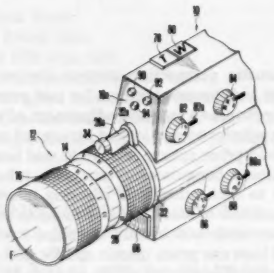
Masamichi Toyama; Tomoshi Takigawa, both of Machida; Mamoru Shimazaki, Tokyo; Hidekazu Okajima, Kawasaki; Toshikazu Ichiyanagi, Tokyo, and Hideto Iwama, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1975, Ser. No. 624,340

Claims priority, application Japan, Oct. 24, 1974, 49-122803

Int. Cl.² G03B *1/00*

U.S. Cl. 352—175 **15 Claims**



1. In a motion picture camera having a film feeding device, a shutter device, a first motor driving means which is provided for driving at least either the film feeding device or the shutter device, a zoom lens system and a second motor driving means which is provided for driving the zoom lens system; a self-timer device for automatic control of the photographing operation of the camera, comprising:

first switching means which is electrically coupled to said first motor driving means for controlling the starting and stopping of said first motor driving means;

second switching means which is electrically coupled to said second motor driving means for controlling the changing of the operation of the second motor driving means beteen a zooming operation and an automatic photographing control operation;

controlling means for controlling said first and second switching means, the controlling means having a first control portion for restricting said first motor driving means constantly to an operative condition, a second control portion for restricting the first motor driving means to an inoperative condition during a first predetermined period of time, a third control portion for restricting the first motor driving means to an operative condition during a second predetermined period of time, a fourth control portion for restricting said second motor driving means to the zooming operation, the fourth control por-

tion corresponding to said first control portion, and a fifth control portion for restricting the second motor driving means to the automatic photographing control operation, the fifth control portion corresponding to the second and third control portions; the first switching means being operatively associated with said controlling means so as to be controlled by the first, second and third control portions of the controlling means; the second switching means being operatively associated with said controlling means so as to be controlled by the fourth and fifth control portions of the controlling means; and said controlling means being connected to said second motor driving means to be driven thereby in acting on said first and second switching means; and

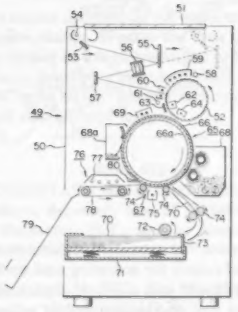
releasable connecting means for operatively connecting said zoom lens system with said second motor driving means, said connecting means being disposed between the zoom lens system and the second motor driving means and operable to release the operative connection therebetween for automatic photographing control.

4,046,466

METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY

Yujiro Ando, Yokohama; Katsunobu Ohara, Kawasaki, and Yukimasa Shinohara, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,697
Claims priority, application Japan, Nov. 22, 1974, 49-134923
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **16 Claims**



13. An electrophotographic apparatus for use in forming an image by modulating ion current through a photosensitive screen having a multitude of openings therein, and comprising a rotatable drum having an electrically conductive member, a photoconductive member to cover said electrically conductive member, and an insulating member on said photoconductive member;

means for forming a primary electrostatic latent image including corona discharge means and optical means for image irradiation, both of which are provided in close proximity to the outer peripheral surface of said drum-shaped screen;

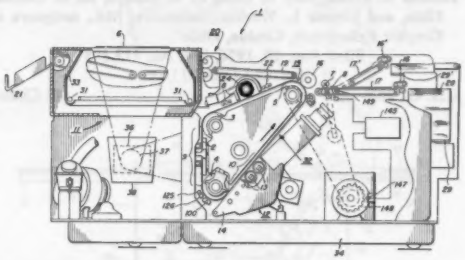
means disposed within said drum-shaped screen for applying a first corona ion flow repeatedly to said screen wherein said corona ion flow is modulated by the same primary electrostatic latent image on said screen to form a plurality of secondary latent images, and for applying a second corona ion flow to said screen for adjustment to eliminate electric charge adhered onto the screen by the corona ion flow for modulation.

4,046,467

ZOOM LENS COPIER

Kenneth W. Laskowski, Fairport, and Edward L. Steiner, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 14, 1975, Ser. No. 577,379
Int. Cl.² G03G *15/00*; G03B *27/34*
U.S. Cl. 355—3 R **14 Claims**



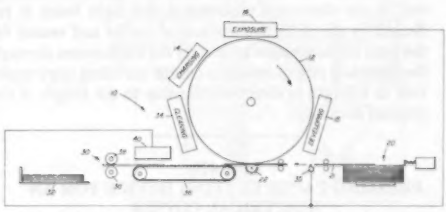
1. In an electrostatic reproduction apparatus having a movable photosensitive member on which latent electrostatic images of originals being reproduced are formed; means to charge the member in preparation for imaging; exposure means for generating the image; developing means to develop the images; said exposure means including a movable lens means; drive means to operate said lens means and vary the lens setting and the size of the images produced; and control means for controlling said drive means and the setting of said lens means; the improvement wherein said lens means includes means for providing images of infinitely variable sizes, with said control means including a first control adapted when actuated to energize said drive means to set said lens means at predetermined settings whereby to produce images of preset size on said photosensitive member, and a second control adapted to override said first control and energize said drive means to change the setting of said lens means whereby to produce different size images on said photosensitive member of non-preset sizes.

4,046,468

METHOD AND APPARATUS FOR CLEANING FUSING MEMBERS OF ELECTROGRAPHIC COPIERS

Walter A. Stryjewski, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 510,847, Sept. 30, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,779
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **14 Claims**



1. An electrographic copying apparatus comprising

means for forming a toner particle image on a surface of a sheet of a support material,

a pressure member for fusing the toner particle image onto the support material, and

depositing means for distributing fusible, relatively dry, finely-divided resinous powder onto at least a portion of the support material surface before the support material surface contacts the pressure member,

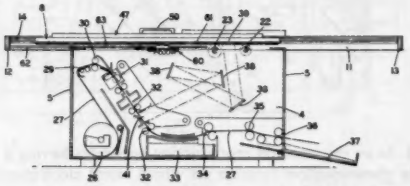
whereby the powder melts and fuses to the support material, carrying contaminants left on said pressure member with the powder to clean said pressure member.

4,046,469

PHOTOCOPY MACHINE HAVING PHOTOELECTRIC PAPER CUT-OFF SENSOR

Thomas E. Frank; Roy E. Gum; J. T. Shoupe, all of Canton, Ohio, and Dennis L. Warner, Baltimore, Md., assignors to Graphic Enterprises, Canton, Ohio

Filed Aug. 10, 1976, Ser. No. 713,193
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—13 **15 Claims**



1. A photocopy machine of the type having an original document carrier mounted for reciprocating movement on the top of a housing for moving the document across an external exposure station for reproduction of the document on a traveling web of copy paper fed from a supply roll of said paper located within the housing, said carrier having a lid and a transparent platen between which the document is placed; knife means for cutting the traveling web from the supply roll; and means controlling the reciprocating movement of the carrier and for controlling operation of the knife means; the improvement including:

a. photoelectric means mounted beneath the transparent platen of the carrier rearwardly of the external exposure station and having light emitting means and light sensing means;

b. a reflecting surface provided on the bottom of the carrier lid in alignment with the photoelectric means and adapted to pass over said photoelectric means upon forward movement of the carrier;

c. electrical circuit means operatively connecting the photoelectric means with the knife means operating control means; and

d. the light emitting means adapted to project a beam of light upwardly through the transparent platen of the carrier toward the carrier lid, with said light beam being blocked by a document in the carrier until passage of the trailing end of the document whereupon said light beam is reflected by the reflective surface of the lid and sensed by the light sensing means to actuate the knife means through the electrical circuit means to cut the traveling copy paper web to a length in direct relationship to the length of the original document.

4,046,470

PRINTING PAPER CUTTING DEVICE FOR AN ELECTRICAL COPIER

Shunji Yamamoto, Shinshiro, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sept. 6, 1974, Ser. No. 503,922
Claims priority, application Japan, Sept. 29, 1973, 48-109767
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—13 **6 Claims**

1. A copy paper cutting device for use in an electrophotographic copying apparatus which uses roll-type copy paper on which the image of the object to be reproduced is printed, said device comprising:

transparent platform means for supporting the object to be copied;

optical projecting means beneath said transparent platform means for projecting the image of the object to be copied on said transparent platform means to an exposure position;

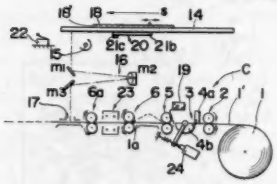
roller means positioned adjacent the copy paper fed from the roll of copy paper, on both sides of the copy paper along the path of the copy paper as it passes through the device, said roller means comprised of:

a first pair of rotating rollers positioned on both sides of the copy paper as it is fed from said roll of copy paper;

a second pair of rotating rollers adjacent and spaced from said first pair of rollers on both sides of said copy paper, said second pair of rollers rotating at a speed at least as fast as said first pair of rollers, whereby the copy paper is stretched between said first and second pairs of rollers; and

a third pair of rotating rollers adjacent and spaced from said second pair of rollers on both sides of said copy paper, said third pair of rollers rotating at a speed slower than said second pair of rollers, whereby a predetermined amount of loop of copy paper is formed between said second and third pairs of rollers;

cutting means located between said first and second pairs of rollers for cutting said copy paper to the size of said object to be copied;



first switch means between said cutting means and said second pair of rollers for actuating said optical projecting means in response to said copy paper passing between said cutting means and said second pair of rollers;

rotating means operatively connected to said roller means for rotating said roller means;

second switch means operatively connected to said cutting means and to said first and second pairs of rollers for deactuating said first and second pairs of rollers and for actuating said cutting means; and

control means adjacent said second switch means for contact therewith and for controlling the size of copy paper cut from said copy paper roll in relation to the size of the object being copied, said control means comprised of:

a scale member graduated with a contracted scale marked with a plurality of scale marks corresponding to the sizes of the objects to be copied on said transparent platform means;

a pointer bar fitted in a slot adjacent said scale member, said pointer bar movably slidable to the desired scale mark on said scale member corresponding to the size of the object to be copied, and

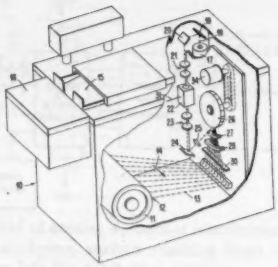
a first actuating member attached to said pointer bar and movable therewith for contacting said second switch means.

4,046,471

DUAL MODE ELECTROPHOTOGRAPHIC APPARATUS HAVING DUAL FUNCTION PRINTING BEAM

Charles Escom Branham, Boulder; Thomas Dean Steury, Longmont, and John Maury Woodward, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,034
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—14 9 Claims



1. In an electrophotographic copier/printer apparatus having a copier illumination station operable to image an original document onto a photoconductor, having a printing beam scanner station operable to raster scan said photoconductor as said beam scanner is controlled by a data-defined image, and having a copy sheet supply station operable to supply copy sheets, said copy sheets being synchronously fed to a transfer station adjacent said photoconductor as said apparatus selectively operates in the copier or printer mode; the improvement comprising:

border erase means operable in the copy mode to cause said beam scanner station to erase the area of said photoconductor bordering an image area equal to the sheet size; and

electrical image processing means operable in the print mode to erase all areas of said photoconductor with the exception of said data-defined image.

4,046,472

ELECTROSTATIC IMAGING APPARATUS

Roger H. Eichorn, deceased, late of Webster, N.Y.; Morton Silverberg, Rochester, N.Y., and by Russell J. Mandrino, executor, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 18, 1975, Ser. No. 569,338
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—14 36 Claims

1. An imaging apparatus employing an electrically insulating web member comprising:

a. an elongate platen for supporting a receiving medium;

b. an elongate electrically photosensitive member;

c. charging means to deposit a substantially uniform electrostatic charge on one surface of said electrically photosensitive member;

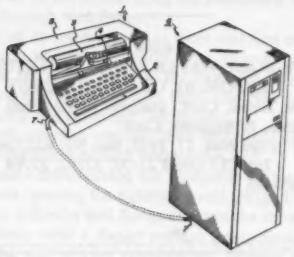
d. means to suspend the insulating web member in a plane substantially parallel to the axis of said platen, and to transport the insulating web member from a position adjacent said platen to a position contacting said one surface of said electrically photosensitive member

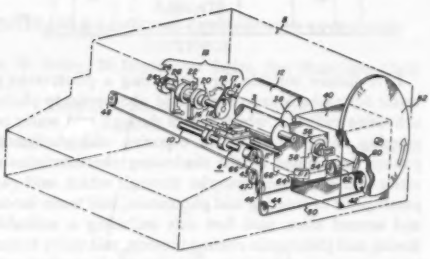
e. an exposure means for creating an electrostatic latent image on the electrically photosensitive member and the insulating web member, said exposure means further including a movable exposure head mounted for translation along a path parallel to the axis of said platen and means to advance said exposure head;

f. development means for depositing marking material on the electrostatic latent image on the insulating web member;

g. transfer means for transferring the marking material image from the insulating web member to the receiving medium on said platen; and

h. control logic circuitry for controlling and coordinating the operation of said means to suspend and transport,





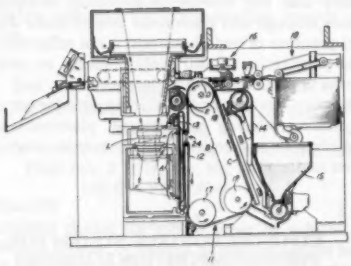
charging means, exposure means, means to advance said exposure head, development means and transfer means whereby an image is created, developed and transferred to a predetermined position on the receiving medium.

4,046,473

PHOTORECEPTOR METHOD AND SYSTEM

John W. Trainor, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 7, 1975, Ser. No. 575,304
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—16 18 Claims



1. A photoreceptor system for a photocopy apparatus including flexible endless photoreceptor means, and drive means for driving said photoreceptor means through processing and imaging stations, wherein the improvement comprises in combination therewith

velocity control means for controlling the velocity of said photoreceptor means such that the velocity thereof at said processing station is substantially constant and the veloc-

ity thereof at said imaging station may simultaneously be less than said substantially constant velocity,

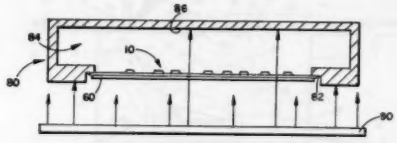
said velocity control means comprising means for simultaneously storing and dispensing portions of said photoreceptor means.

4,046,474

BLACK-BODY WAFER SUPPORT FIXTURE FOR EXPOSURE OF PHOTORESIST

Soo N. Lee, Irvine, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 17, 1975, Ser. No. 632,736
Int. Cl.[2] G03B 27/52, 27/32, 27/04
U.S. Cl. 355—43 **13 Claims**



1. A fixture suitable for supporting a photoresist coated wafer during back exposure of said photoresist to photoresist-activating radiation which passes through said wafer prior to entering said photoresist for exposing said photoresist in a pattern determined by the shadowing characteristics of said wafer and any other material through which said radiation passes prior to entering said photoresist, said wafer having first and second sides, said first side including a utilizable area having said photoresist coating thereon, said wafer including at least a portion which is transmissive of photoresist-activating radiation, said fixture comprising:

housing means having upper and lower surfaces, said upper surface adapted to face a source of said photoresist-activating radiation during the exposure of said photoresist;

said housing means including support means for supporting said wafer with said first side of said wafer down for back exposure of said photoresist by photoresist-activating radiation which passes through said transmissive portion of said wafer prior to entering said photoresist;

said support means and said housing means spaced at least a predetermined distance from said photoresist disposed on said utilizable area of said wafer when said wafer is supported by said support means with said first side of said wafer down, said predetermined distance sufficient to assure that any photoresist-activating radiation which passes through said photoresist coated wafer during normal exposure of said photoresist is not reflected back into said photoresist by said support means or said housing means in photoresist-activating quantities, and;

said housing means including shield means for preventing an exposure-producing quantity of photoresist-activating radiation from entering said photoresist coating except from said wafer.

4,046,475

EXPOSURE CONTROL SYSTEM FOR PHOTOCOMPOSITION MACHINES

Thomas Allan Booth, Flanders, N.J., and Frank Lynn Scholten, Katonah, N.Y., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

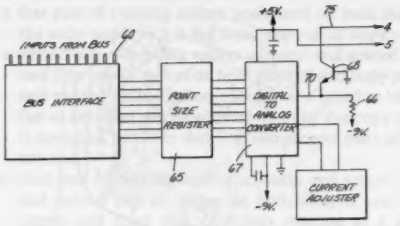
Filed Feb. 3, 1976, Ser. No. 654,930
Int. Cl.[2] G03B 27/76
U.S. Cl. 355—69 **2 Claims**

1. In a photocomposition machine, an exposure control system for providing irradiance of an optically projected image, of an intensity which will provide full exposure of a photosensitive receptor for a selected area of the image in a predetermined time on an image plane, comprising:

a font means for providing at least one font of characters to be projected and presenting individual characters at a projection location;

a projection light source to illuminate said font of characters;

a variable magnification lens system for producing the desired projected size of the character and for projecting the illuminated character from said font means to an image plane;



said light source being a high-intensity and short-duration flash coordinated to fire when a selected character of the font reaches a projection position relative to said lens system;

a register for storing a digital number representative of the particular point size to be projected;

a controller means for accepting input coding impelling the register to output to a digital-to-analog converter; and

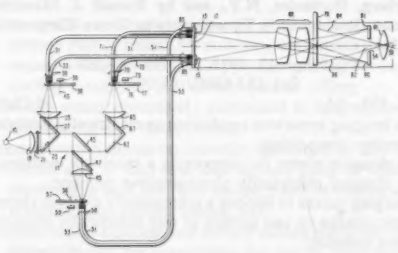
means for utilizing the analog output to supply a corresponding level of electrical energy to said projection light source.

4,046,476

COLOR DESIGN METHOD

John Barrie Charamella, Port Washington, N.Y.; John Warren Long, Freehold, N.J., and Jerry Lloyd Stone, Boothwyn, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 29, 1975, Ser. No. 645,215
Int. Cl.[2] G03B 27/32; G03G 5/12, 13/01
U.S. Cl. 355—77 **10 Claims**



1. An on-line method of obtaining color copies of a color variable image comprising;

a. independently changing and viewing the colors of individual components of a color variable image until a desired color combination of the image is obtained;

b. projecting the colored image from (a) onto the input of an electrophotographic fast multi-color reproduction copier;

c. making a copy of the image in a visual match of the colors projected; and

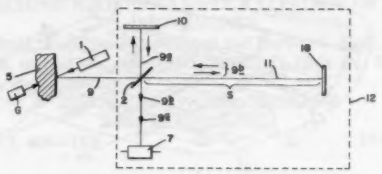
d. repeating steps (a), (b) and (c) any desired number of times to obtain fast copies of the image in a multiplicity of color combinations.

4,046,477

INTERFEROMETRIC METHOD AND APPARATUS FOR SENSING SURFACE DEFORMATION OF A WORKPIECE SUBJECTED TO ACOUSTIC ENERGY

Walter Kaule, Cologne, Germany, assignor to Krautkramer-Branson, Incorporated, Stratford, Conn.

Filed Nov. 5, 1975, Ser. No. 629,062
Claims priority, application Germany, Dec. 4, 1974, 2457253
Int. Cl.[2] G01B 9/02
U.S. Cl. 356—109 18 Claims



1. The method of sensing by optical interference the deformation of a workpiece surface resulting from transmitting acoustic energy into the workpiece comprising:

applying to a workpiece acoustic wave energy for causing surface deformation on such workpiece;

transmitting a monochromatic beam of light upon the surface of the workpiece for sensing such deformation;

splitting said beam after reflection at said workpiece surface into a measuring beam portion and a reference beam portion;

transmitting said measuring beam portion to photoelectric sensing means, and

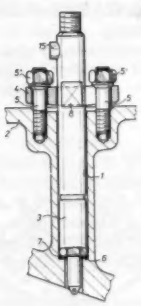
transmitting said reference beam portion over a delay path and thereafter bringing said reference beam to coincidence with said measuring beam portion at said photoelectric means.

4,046,478

SECURING MEANS FOR FUEL INJECTION NOZZLES

Friedrich Messerschmidt, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Continuation of Ser. No. 231,115, March 2, 1972, abandoned.
This application Oct. 28, 1975, Ser. No. 626,182
Claims priority, application Germany, Mar. 2, 1971, 2109727
Int. Cl.[2] F16B 9/00
U.S. Cl. 403—262 3 Claims



1. Means for securing a fuel injection nozzle body to the cylinder head of an internal combustion engine, the body having a generally circular cross section, a flattened area provided on the outer surface of the nozzle body along a portion thereof and a shoulder forming part of the nozzle body and bounding the flattened area, with the shoulder extending radially inwardly towards the flattened area, said securing means comprising

A. a separate flange having:

1. a first opening of a diameter at least as large as the diameter of the nozzle body for permitting the latter to pass through said flange;
2. a second opening extending from said first opening and having a width sufficiently large to receive the thickness of the nozzle body at the flattened area thereof;
3. a third opening extending from said first opening for receiving therethrough bolt means;
4. a fourth opening separate from said other openings for receiving therethrough bolt means; and

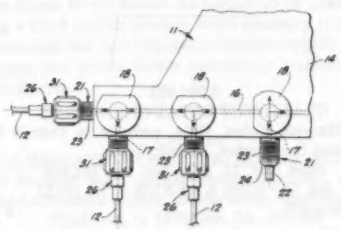
B. bolt means dimensioned for reception within said third and fourth opening for tightening said flange to the cylinder head, whereby said flange engages the shoulder of the nozzle body with a flange portion immediately adjacent and along said second opening and thereby clamps the nozzle body to the cylinder head.

4,046,479

REMOVABLE LOCKING CONNECTOR FOR LUER FITTINGS

Hyman W. Paley, 20 Broadmoor Drive, San Francisco, Calif. 94132

Filed Apr. 23, 1976, Ser. No. 679,835
Int. Cl.[2] B25G 3/00
U.S. Cl. 403—306 6 Claims



1. In apparatus for interconnecting medical appliances: a male Luer fitting having a body with an axially extending tapered portion and an external thread of a first pitch on the body toward the base of the tapered portion, a female Luer fitting having an axially extending tapered bore receiving the tapered portion of the male fitting and an external thread of a second pitch, and a connector sleeve removably mounted on the male fitting and having internal threads of the first and second pitches engaging the corresponding threads on the Luer fittings.

4,046,480

MOUNTING DEVICE FOR VEHICLE SHOCK ABSORBER

John R. Leensvaart, 17632 Wellington, Tustin, Calif. 92680

Filed Feb. 2, 1976, Ser. No. 654,348
Int. Cl.[2] F16B 39/36
U.S. Cl. 403—398 1 Claim

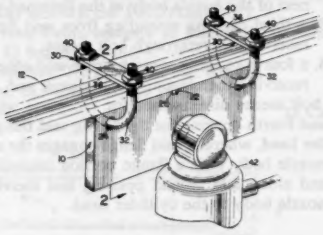
1. A mounting device for special types of vehicle shock absorbers which because of various difficulties cannot be conventionally mounted, wherein the device is mounted to the axle of the vehicle thereof, the device comprising:

a substantially rectangular truss plate having upper and lower longitudinal edges;

the upper edge being formed with a longitudinal arcuate plane to receive said axle thereon in direct engagement;

a transverse notch centrally disposed between the ends of such longitudinally arcuate upper edge to receive a nob formed in said axle, thereby preventing longitudinal movement of said truss plate;

a plurality of holes disposed on said plate, wherein at least two holes are horizontally aligned in parallel relation to said upper edge thereof disposed adjacent each end of said truss plate, and a third hole centrally disposed between and below said first two holes and adjacent said lower edge of said truss plate, whereby the shock absorber is secured to said truss plate; and



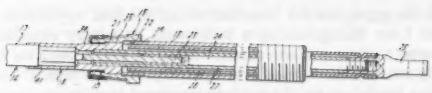
a clamping means formed by a "U"-shaped clamp having threaded, extending free ends, said clamp being received in said first two holes and positioned about the axle of the vehicle, and including a cross bar arranged to be disposed over each free end of said clamp having nuts threadably received on each threaded free end of said clamp.

4,046,481

GLAND NUT RETAINING MEANS

Louis T. Horvath, Solon, Ohio, assignor to Detroit Marine Engineering Corporation, Detroit, Mich.

Filed Nov. 22, 1976, Ser. No. 743,950
Int. Cl.² B25G *3/00*; F16B *7/18, 39/32*
U.S. Cl. 403—320 **3 Claims**



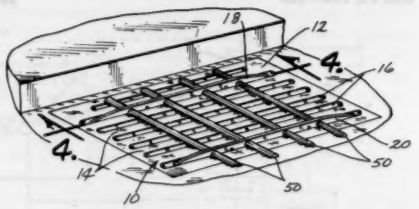
1. In combination, a gland nut and a tubular conduit fitting, said gland nut having a bore threaded at one end and a square internal shoulder engaging a square external shoulder on said conduit fitting, an outer surface on said nut having a pluraliy of circumferentially spaced axially extending portions which are at greater distances from the axis than the remaining area of the outer surface, a retainer of spring-like material having an annular flat main portion surrounding said fitting adjacent the other end of the nut and a plurality of inwardly extending locking fingers tightly engaging said fitting, the inner edges of said locking fingers being on a diameter slightly less than the external fitting surface whereby slipping said retainer axially onto said fitting causes said fingers to slightly flex in a direction preventing backward movement of the retainer and frictionally holding the retainer against rotation, and a plurality of circumferentially spaced axially extending tabs on the outer edge of said flat main portion, said tabs having portions engaging the outer surface of said nut, said last-mentioned portions being engageable by said nut surface portions upon forced rotation of said nut whereby said tabs will be temporarily spread apart to allow said portions to pass thereunder, said tabs having sufficient inward spring-like engaging force to prevent said portions from passing thereunder in response to vibration of the nut.

4,046,482

PROTECTIVE COVER FOR SEWER GRATES

Harold R. Paasch, 405 Sharon Drive, Ankeny, Iowa 50021

Continuation-in-part of Ser. No. 552,258, Feb. 24, 1975, and Ser. No. 408,161, Oct. 19, 1973, Pat. No. 3,914,911. This application Aug. 13, 1975, Ser. No. 604,304
Int. Cl.² E01C *11/22*
U.S. Cl. 404—4 **6 Claims**



1. In combination with a horizontally disposed sewer grate having a plurality of longitudinally extending spaced apart bars defining elongated openings therebetween, the invention comprising,

a bicycle wheel protective cover secured to said sewer grate,

said protective cover having at least first and second elongated bar members, said bar members having a length substantially the same as the elongated openings in said sewer grate and being at least partially positioned within two of such openings,

a plurality of spaced apart support bars secured to said bar members and extending in a lateral direction with respect thereto over the longitudinally extending bars on said sewer grate and over the elongated openings in said grate to prevent a bicycle wheel from moving downwardly through the elongated openings in said grate,

said support bars being selectively adjustably secured to said first and second bar members to permit the cover to be secured to sewer grates having various grate dimensions,

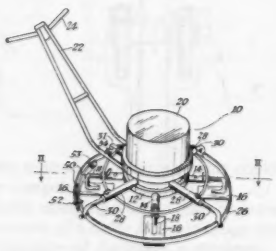
and securing means rigidly securing said protective cover to said sewer grate to prevent relative movement therebetween.

4,046,483

TROWELING MACHINE

John W. Sutherland, P.O. Box 5050, Jacksonville, Fla. 32207

Filed Nov. 18, 1976, Ser. No. 742,858
Int. Cl.² E01C *19/22*
U.S. Cl. 404—112 **42 Claims**



7. In a troweling machine having a housing, a rotatable shaft extending downwardly therefrom, a plurality of troweling blades having outer ends, means for mounting said troweling blades to said shaft, a guard ring for shielding the outer ends of said blades from contact with obstacles, said guard ring having a circumference, a stabilizer arm connecting said guard ring to

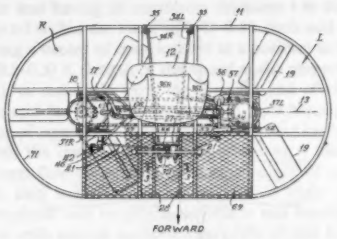
said housing, the improvement comprising, in combination, said mounting means including adjustable means for adjusting the distance between said shaft and the outer ends of said blades, said stabilizer arm including length adjusting means for adjusting the distance between said shaft and said guard means, and said guard ring including adjustable means for adjusting the circumference of said guard ring.

4,046,484

SPACED-ROTOR RIDE-TYPE SURFACE WORKING MACHINE WITH SINGLE-STICK CONTROL OF ALL MOVEMENTS

Orville H. Holz, Sr., Palm Harbor, and Norbert J. Holz, Spring Hill, both of Fla., assignors to Orville H. Holz, Jr., Roselle, Ill., a part interest

Filed Nov. 15, 1976, Ser. No. 741,610
Int. Cl.² E01C *19/22*
U.S. Cl. 404—112 **10 Claims**



7. A ride-type surface-working machine including a frame carrying an operator's seat and carried by a pair, only, of surface-working rotors having generally vertical axes spaced apart in a biaxial plane to provide a working zone equal in width to approximately their joint diameters; a power plant for driving said rotors; and means for applying tilting forces to said rotors with selective angularity about each rotor to propel the machine by selectively increased traction of the rotors on the work, said means including a universally pivotal mounting between one of the rotors and the frame and means for applying a tilting force transversely of the biaxial plane between that rotor and the frame; the other rotor having a mounting to the frame which is transversely rigid with respect to said plane so that the reaction resulting from applying the tilting force to the transversely pivotable rotor is transmitted through the frame and the transversely rigid mounting to the rotor thereof, whereby rotation of the two rotors in opposite directions will propel the machine approximately along said plane; said power plant and said seat both having gravity centers, including the operator in the case of the seat, approximately in the biaxial plane and approximately centered between the rotor axes so that evenness of weight distribution will not be impaired by differing operator weights.

4,046,485

EARTH AND ROAD ROLLER WITH OPPOSITELY SKEWED TANDEM STEERING DRUMS

Hartley P. Dermond, S. Venice, Fla., assignor to William H. Clark, Sharon, Pa., a part interest

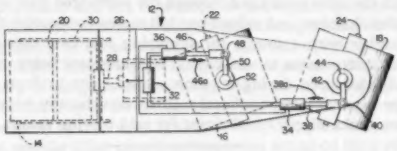
Filed Dec. 9, 1975, Ser. No. 639,113
Int. Cl.² E01C *19/26*
U.S. Cl. 404—123 **5 Claims**

1. A roller for treating surfaces, comprising:

two surface-treating drums operatively connected to a frame structure and arranged one behind the other, each drum mounted on an independent, horizontal axle to permit rotation about their respective axes across the surface to be treated, the drums being disposed at a positively-selected skew angle relative to each other and in opposite directions relative to the normal direction of movement of the roller, the skew angle being positively selected from a range of between 2°–10° to adapt the roller to different surfaces to be treated;

vertical axle means connected to said frame structure and to the horizontal axle of each of the two drums so that each drum can be turned about a vertical axis, said vertical axle means being aligned along the normal direction of movement to the roller;

steering means on said frame structure for simultaneously turning both of said vertical axle means to maintain the positively-selected skew angle between the two drums during curvilinear movement of the roller, said steering means including steering control means coupled to said



vertical axle means and actuation means operatively coupled to said steering control means;

adjustment means operatively connected to said steering means for adjusting the angle of skew of each drum relative to the normal direction of movement of the roller and relative to each other; and

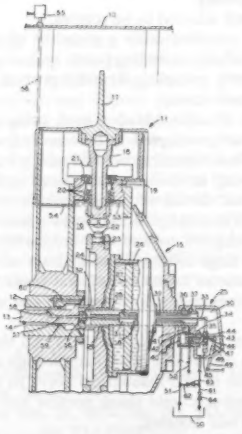
moving means connected to said frame structure for causing the drums to roll across the surface to be treated, including a third surface-treating drum rotatably mounted on a horizontal axis and disposed in tandem relative to said two drums and motor means operatively connected to said third drum.

4,046,486

LUBRICATION OF FAN BLADE BEARINGS

Werner Bernard Kolb, Zweibruecken, Germany, assignor to Turbo-Lufttechnik GmbH, Zweibrucken, Germany

Filed Aug. 6, 1975, Ser. No. 602,358
Claims priority, application Germany, July 8, 1974, 2437932
Int. Cl.² F04D *29/36*
U.S. Cl. 416—157 R **6 Claims**



1. In combination with an axial flow fan having a housing, at least one rotor disposed within said housing and secured to a rotatable drive shaft formed with a center bore, a control shaft extending through the bore in spaced relation to the drive shaft, wall means defining a cavity within said rotor, blades

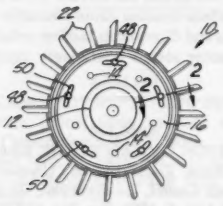
mounted on the rotor, each of said blades being adapted to be angularly shifted about its central axis and including being fitted with a shank extending through a peripheral section of said wall means, bearing means interposed between said shank and peripheral wall section, a hydraulic device for shifting said blades, and wherein the control and drive shafts and the hydraulic device define a means for conveying a fluid lubricant into said cavity, the conveying means including the hydraulic device having an inlet and an outlet chamber, a fixed open ended tubular member interposed between and communicating with said inlet and outlet chambers, the outlet chamber having a perforated wall, and the control and drive shafts being formed with passages communicating with the center bore and with the rotor cavity and through the perforated wall with said outlet chamber, and valved conduit means connecting the inlet chamber with a source for supplying lubricant through the conveying means to said cavity, said lubricant being centrifugally displaced during rotation of the rotor to form a fluid layer against said peripheral wall section thereby providing a continuous supply of lubricant for said bearing means.

4,046,487

TURBINE BLADE INDEXING ASSEMBLY

Herman N. Lenz, Lambertville, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Aug. 20, 1975, Ser. No. 606,071
Int. Cl.² F01D 5/30
U.S. Cl. 416—208 **2 Claims**



1. A device for testing the characteristics of a turbine assembly with the turbine blades adjusted through a wide range of pitches and with different numbers of turbine blades, said devices comprising:

a turbine hub adapted to be rotated,

a housing provided with a plurality of circumferentially spaced radially extending bores, each of said bores having an inwardly extending shoulder portion intermediate the ends of said bores,

a plurality of turbine blades, each being provided with a shank portion adapted to be received within said bores with an end extending beyond said bore, said shank portion having an enlarged abutment surface which seats against said shoulder formed in said bore when said shank portion is inserted radially inwardly into one of said bores,

a retainer ring for each of said turbine blades, each of said retainer rings having an axial bore of substantially the same diameter as the end of said shank portion whereby said retainer ring will fit over the end of said shank portion,

said retainer rings and said ends of said shank portion each having a diametrical bore therethrough and a pin member receivable in said diametrical bores to thereby lock said ring member to said shank portion and thus said turbine blade to said housing,

said pin members each having a spherical head portion,

an indexing ring detachably mounted to said housing and provided with a plurality of actuator slots disposed to receive the head portions of said pin members,

means for selectively rotating said indexing ring to thereby move said head portions of said pin members whereby said turbine blades will be rotated about their axis to change the pitch thereof,

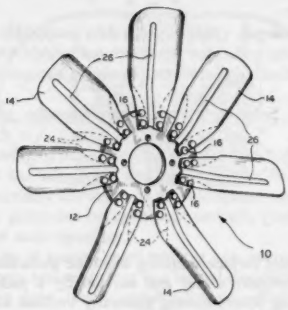
said housing with said turbine blades being detachably mounted to said hub whereby said housing and said turbine blades can be removed as a unit from said hub to permit individual removal of said turbine blades from said housing for replacement or testing purposes or to permit said housing to be replaced by a similar housing having different turbine blade spacings to thereby permit the testing of the effect of different blade spacings on the operation of said turbine assembly.

4,046,488

RADIATOR COOLING FAN

Robert G. Wickham, 3643 Jefferson, Clarklake, Mich. 49234

Filed Nov. 7, 1975, Ser. No. 629,719
Int. Cl.² F04D 29/34
U.S. Cl. 416—210 R **1 Claim**



1. In a vehicle cooling system, the combination comprising:

a vehicle engine and a radiator system for cooling said engine; and

a spiderless fan associated with said radiator including a substantially planar, annular mounting hub;

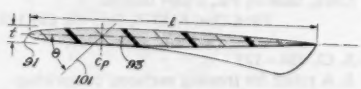
a plurality of elongated fan blades, each of said fan blades being twisted, having a radially extending reinforcing rib formed (therein) therein and being folded upon themselves along a portion less than the entire length of both the leading and trailing edges and being riveted to said hub through both of said folded edges, said folded edges extending radially beyond said hub and radially within said hub.

4,046,489

AERODYNAMIC FAN BLADE

Jack E. Fairchild; Bruce E. Maurer, both of Fort Worth, and Robert L. Woods, Mesquite, all of Tex., assignors to Eagle Motive Industries, Inc., Fort Worth, Tex.

Filed Oct. 8, 1975, Ser. No. 616,867
Int. Cl.² F04D 29/38
U.S. Cl. 416—223 R **22 Claims**



1. In a multi-blade fan assembly for effecting flow of air in heat exchange relationship with a contained fluid responsive to a driving assembly for effecting rotation, and including:

a. a central hub having means for being attached to the driving assembly; and

b. a plurality of fan blades connected with said central hub

and extending radially therefrom; the improvement comprising:

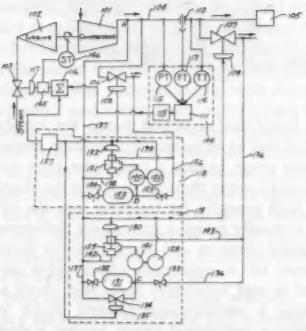
c. having said fan blades manufactured in accordance with modified subcritical aerodynamic airfoil criteria so as to be efficient for moving ambient air at low relative speeds between said fan blade assembly and air and for minimum power consumption at high relative said speeds; each said fan blade having a length to width ratio L/W within the range of 1–9, where L is the length of the blade from its base to its tip and W is the width of the blade at its widest point; each said fan blade having a length L within the range of 6–18 inches; having thin airfoil leading and trailing edges; said leading edge being sufficiently thin that said blade does not stall due to the high degree of separation of said air stream encountering the leading edge of said blade; and having a chord that is totally contained within a planar cross section of the blade at said chord, each said cross section being substantially symmetrical respect to its chord with minimum camber and lift on said blade and having its maximum thickness t to its length l ratio t/l within the range of 0.03–0.12; each said fan blade having a center of mass located at a position in the range of (0.2–0.3) X (length of the chord at the respective location), as measured from the forward end of the chord; each said fan blade having a chord taper throughout the range of taper in the range of 0.25–0.75; and having a twist within the range of 10°–20° for obtaining a substantially uniform flow of air throughout the length of said blade; each said fan blade having a positive angle of attack throughout said length of said blade and having a pitch angle with respect to the central plane of said hub within the range of 25°–45° at the end adjacent said hub and within the range of 10°–30° at the outer radial end farthest from said hub.

4,046,490

METHOD AND APPARATUS FOR ANTISURGE PROTECTION OF A DYNAMIC COMPRESSOR

Alexander Rutshtein, and Naum Staroselsky, both of West Des Moines, Iowa, assignors to Compressor Controls Corporation, Des Moines, Iowa

Filed Dec. 1, 1975, Ser. No. 636,803
Int. Cl.² F04B *49/00*; F03B *15/00*
U.S. Cl. 417—28 **4 Claims**



1. A method of integrated antisurge control of a controlled object including a dynamic compressor having a discharge and a suction port, a driver for said compressor, a pipeline connecting the discharge port of the compressor to a user of compressed gas, a quick-acting on-off fluid relief means connected to said pipeline, and a control means for controlling a main controlled parameter, said parameter being one of (a) the mass flow rate of a gas to the user, (b) the discharge pressure of the compressor, (c) the suction pressure of the compressor and (d) the speed of rotation of the compressor, said method comprising:

measuring one of the speed of pressure drop in the discharge port of the compressor and the speed of flow drop in the suction port of the compressor;

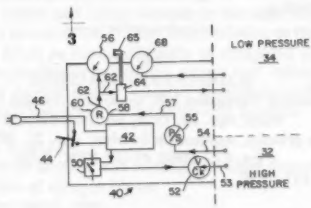
simultaneously operating two different means, one of said two means being said fluid relief means, the other of said two means being a means operatively connected to the compressor for changing the flow rate of a gas through the compressor, said operation further comprising two simtultaneous actions, one of the actions being the full automatic opening of the fluid relief means when the rate of one of the pressure drop in the discharge port of the compressor and the flow drop in the suction port of the compressor and the flow drop in the suction port of the compressor reaches a magnitude corresponding to the beginning of surge, the time of said full opening of the fluid relief means being chosen so as to prevent the developing of surge as indicated by said one of the speed of pressure drop in the discharge port of the compressor and the speed of flow drop in the suction port of the compressor, and the other of said actions being acting on the means for changing the flow rate through the compressor to compensate for the decrease of the flow rate to the user caused by the outflow of the compressed gas through the opened relief means so as to insure the invariability of one of said main controlled parameters.

4,046,491

TENNIS BALL PRESERVER

Malcholm O. Roeder, 402 S. Wayne St., Danville, Ind. 46122

Filed Jan. 22, 1976, Ser. No. 651,513
Int. Cl.² F04B *49/00*; B65D *85/00*
U.S. Cl. 417—44 **4 Claims**



4. An apparatus for storing tennis balls in a pressurized environment to preserve their pressurization comprising a tank defining an interior, a bulkhead for dividing the interior into a high pressure reservoir and a lower pressure storage chamber having an access door for entry and removal of tennis balls therefrom, a compressor for supplying compressed air to said reservoir, means for providing compressed air flow from said reservoir to said storage chamber and means for regulating said flow to insure substantially constant pressure in said storage chamber, said storage chamber being proportioned and designed to batch process tennis balls and said reservoir and compressor means having capacities sufficient to maintain said constant pressure in said storage chamber.

4,046,492

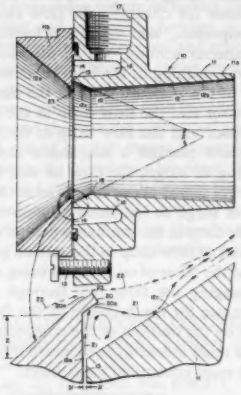
AIR FLOW AMPLIFIER

Leslie R. Inglis, Cincinnati, Ohio, assignor to Vortec Corporation, Cincinnati, Ohio

Filed Jan. 21, 1976, Ser. No. 651,193
Int. Cl.² F04F *5/00*
U.S. Cl. 417—197 **11 Claims**

1. A fluid flow amplifier of relatively high amplification ratio, comprising a body having surfaces defining an axial flow passage therethrough; said passage including an inlet section, an outlet section, and an intermediate section therebetween;

the surface of said intermediate section being frusto-conical in shape and terminating at said outlet section in a throat opening of reduced cross section; said body also having means defining a constantly open annular nozzle between said inlet and intermediate sections for injecting a thin continuous film of pressurized fluid inwardly into said passage along a transverse plane; and a deflector ring disposed within said passage and intersecting said transverse plane; said ring having an outer surface spaced inwardly from said nozzle for contacting the film of pressurized fluid discharged transversely inwardly by said nozzle and for deflecting said film axially towards the frusto-conical surface of said intermediate section; said ring also having an inner surface adjoining the surface of said inlet section and defining an opening substantially larger than said throat opening.

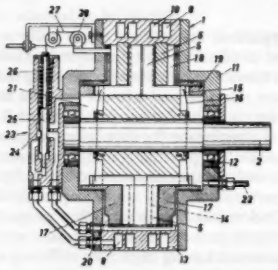


4,046,493

SLIDING VANE MACHINE

Torsten Ålund, Persgatan 9 B, Goteborg, Sweden (416 58)

Filed Apr. 20, 1976, Ser. No. 678,495
Claims priority, application Sweden, Apr. 21, 1975, 7504554
Int. Cl.[2] F04B *49/08*; F03C *3/00*
U.S. Cl. 417—220 **4 Claims**



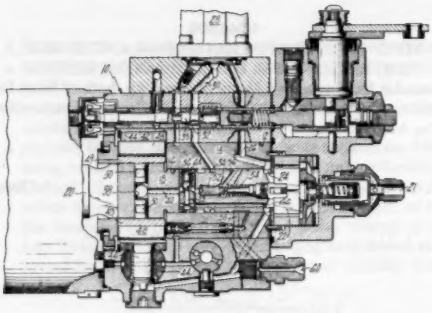
1. A sliding vane machine comprising in combination a housing, a rotor being rotatable therein, a plurality of axial grooves spaced evenly along the circumference of said rotor, each one of said grooves supporting two vanes, which vanes are axially displaceable in said groove, between a first position in which they are entirely contained inside said groove, to a second position in which each separate vane projects axially from the rotor, a number of radially extending partition walls fixed in the housing and dividing the interior thereof into a plurality of pressure chambers, guide means in the housing adapted to bring said vanes to said first position when a groove, during the rotational movement of the rotor, passes one and each of said partition walls, a fluid inlet in each one of said pressure chambers, a fluid supply line common for all fluid inlets, a fluid outlet in each one of said pressure chambers, a fluid discharge conduit common for all fluid outlets, a pressure plate arranged axially displaceable at each axial side of said rotor and in engagement with the ends of the said vanes projecting from the said groove when the vanes are in their said second position, a number of slots arranged in said pressure plates for said partition walls, the axial position of said pressure plates being adjustable following pressure variations in a fluid-containing first space between the pressure plate surface remote from the said vanes and the adjacent end wall of the housing, and a pressure-actuated sliding valve body, slidingly arranged in a valve housing provided with a first conduit between the interior of the valve housing and said fluid-containing first space, a second conduit between the interior of the valve housing and a second low pressure space and a third conduit between the interior of the valve housing and a third, high pressure space connected to said supply line, said sliding valve body being displaceable in said valve housing to alternatively connect the said first conduit with either one of said second and said third conduits, for controlling fluid pressure in said first space.

4,046,494

FUEL INJECTION PUMP AND REPLACEABLE CHECK VALVE THEREFOR

Daniel Edwin Salzgeber, Windsor; Robert Raufeisen, and Charles W. Davis, both of Simsbury, all of Conn., assignors to Stanadyne, Inc., Hartford, Conn.

Filed Aug. 20, 1975, Ser. No. 606,058
Int. Cl.[2] F04B *25/00, 29/00, 27/08*
U.S. Cl. 417—253 **6 Claims**



1. A liquid fuel injection pump for supplying measured charges of fuel to an internal combustion engine comprising a distributor rotor having a transverse bore extending therethrough and a pump chamber in which the charges are pressurized to high pressure for injection into the cylinders of said engine, a transfer pump, a passage for delivering the output of said transfer pump to said pump chamber through said transverse bore, and a replaceable check valve cartridge slidably mounted in said transverse bore, said check valve cartridge comprising a prefabricated integral check valve assembly comprising a cylindrical barrel having a single diameter, a hollow valve seat secured to said barrel at one end thereof, a stop secured to the barrel at the other end thereof, a ball for seating on said valve seat, a chamber in said barrel between said valve seat and said stop, a closure piston slidably mounted within said stop and engageable with said ball for seating the ball following the filling stroke of the pump chamber, means for connecting the output of said transfer pump to a cavity at the end of said piston to urge the piston in a direction to seat the ball and means engaging both ends of said barrel for remov-

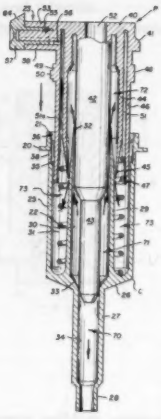
ably retaining said cartridge in said transverse bore without transmitting any transverse forces to said distributor rotor.

4,046,495

DISPENSER PUMP

Bruce F. Grimm, Jr., 119 Pine Way, Broomfield, Colo. 80020

Filed Sept. 30, 1976, Ser. No. 727,992
Int. Cl.[2] B67D *5/40*
U.S. Cl. 417—268 8 Claims



1. A fluid dispenser pump having a piston extending from one end of a cylinder with resilient means urging the piston from the cylinder to its extended position for manual movement into the cylinder to its retracted position, said piston and cylinder being elastomeric plastic members with complementary cylindrical walls forming a sequence of chambers, which include:

a. an inlet chamber to communicate with a fluid supply;

b. an auxiliary pressure chamber normally sealed from the inlet chamber but communicating with the inlet chamber whenever the piston is at its fully extended position;

c. an operating chamber communicating with the auxiliary pressure chamber and a first check valve means between the operating and auxiliary pressure chambers which permits flow from the auxiliary pressure chamber to the operating chamber but prevents a reversal of such flow;

d. a discharge chamber communicating with the operating chamber and a second check valve means between the discharge and operating chambers which permits flow from the operating chamber to the discharge chamber but prevents a reversal of such flow; and

e. an outlet from the discharge chamber; wherein

f. said auxiliary pressure chamber and said operating chamber increase in volume when the piston is being extended and decrease in volume when the piston is being retracted whereby reciprocation of the piston into the cylinder pumps fluid past the check valve means and through the pump; and

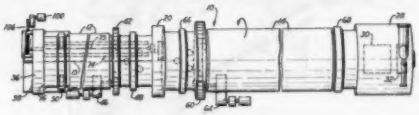
g. said check valve means are formed as thinwall sleeve members embracing stem portions, said sleeve members expanding responsive to fluid pressure, to move away from the stem portions to permit fluid flow therepast.

4,046,496

APPARATUS FOR AGGLOMERATING FINELY DIVIDED AGGLOMERATIVE MATERIALS IN A ROTATING DRUM

Everett Gorin, Pittsburgh; William A. Jasulaitis, Bridgeville; George E. Wasson, and Frank William Theodore, both of Pittsburgh, all of Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Division of Ser. No. 627,687, Oct. 31, 1975, Pat. No. 3,988,114, which is a continuation of Ser. No. 466,832, May 3, 1974, abandoned. This application June 21, 1976, Ser. No. 698,223
Int. Cl.[2] B01J *2/12;* B29B *1/02*
U.S. Cl. 425—222 6 Claims



1. Apparatus for agglomerating finely divided agglomerative material comprising,

a cylindrical rotary drum having a longitudinal axis and an inner wall,

means to rotate said cylindrical drum about said drum longitudinal axis at a preselected speed and deposit a layer of finely divided agglomerative material on said drum inner wall,

an elongated rotary scraper having a body portion with a longitudinal axis, said rotary scraper positioned in said cylindrical drum in spaced relation to said cylindrical drum inner wall with said rotary scraper body portion longitudinal axis spaced from said drum longitudinal axis,

blade means extending radially outwardly from said scraper and extending lengthwise thereon,

means to rotate said rotary scraper in the same direction of rotation as said drum in fixed timed relation to the rotation of said drum to form a plurality of elongated alternating and longitudinally extending ridges and valleys in said layer of agglomerative material deposited on said drum inner wall according to the following formula:

$$N = (b\ U_2/U_1)$$

N = a whole number and number of ridges formed

b = number of scraper blades

U_1 = drum speed, rpm

U_2 = scraper speed, rpm and,

said rotary scraper arranged to remove other finely divided agglomerative material deposited on the surface of said longitudinally extending ridges and valleys formed in said layer of agglomerative material.

4,046,497

CUTTING APPARATUS

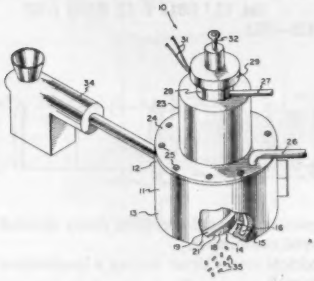
Ritchey O. Newman, Jr., Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 525,895, Nov. 21, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,788
Int. Cl.[2] B29C *17/14*
U.S. Cl. 425—313 2 Claims

1. In a polymer severing apparatus which comprises a housing, the housing defining a generally annularly disposed extrusion face, the extrusion face having a plurality of generally radially inwardly extruding extrusion orifices, the housing defining a polymer receiving cavity, the polymer receiving cavity surrounding the extrusion face, the polymer receiving cavity being in communication with the extrusion orifices and the housing defining a polymer supply passage in communication with the polymer receiving cavity, the polymer supply passage being adapted to be in communication with a source of heat plastified synthetic resin polymer, a cutter having a generally circular configuration and being rotatably mounted and

coaxially disposed within a cavity defined by the housing, the cutter having at least a cutting blade adapted to pass by the extrusion orifices of the housing and sever strands which may emerge from the extrusion orifices,

the improvement which comprises the extrusion orifices being disposed in a generally frustoconical surface defined by the housing, the cutter having a generally corresponding frustoconical configuration, the cutter having an end of larger diameter and an end of smaller diameter,



the cutter having at least one locating surface disposed at the smaller end thereof and adapted to engage adjacent generally like frustoconical surfaces of the housing, the locating surface on projection toward the larger end of the cutter encircling but not contacting terminal portions of the cutting blade,

the cutter being rotatably mounted upon a hollow shaft, the shaft having fluid cooling dispersing means positioned on the shaft at a location generally adjacent to the end of the larger diameter of the cutter.

4,046,498

APPARATUS FOR BLOW-MOLDING HOLLOW ARTICLES, IN PARTICULAR BOTTLES

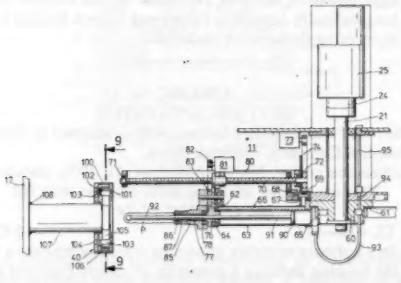
Adolf Appel, Egestorf-Nordheide, and Wolfgang Reymann, Hamburg, both of Germany, assignors to Gildemeister Corpoplast GmbH, Hamburg, Germany

Filed Oct. 1, 1976, Ser. No. 728,809

Claims priority, application Germany, Oct. 8, 1975, 2545131

Int. Cl.² B29C *17/07*

U.S. Cl. 425—526 **7 Claims**



1. A machine for blow molding articles from blowable parisons, comprising a rotatable shaft, means for rotating said shaft in stepwise fashion, a plurality of work stations located concentrically about said shaft at which various heating and blowing operations are carried out, at least one of said stations being positioned further from the shaft than others of said stations, a plurality of radial arms carried by said shaft for rotation therewith, each such arm comprising telescopic inner and outer sections movable relative to one another to vary the radial length of the arm, the inner of said sections being secured to the shaft and the outer of said sections carrying at its outer end an adapter for retaining a parison, fixed actuating means located adjacent said at least one station, said actuating means engaging only the outer section of that arm positioned at said at least one station, and means for actuating said actuating means to telescopically extend said arm sufficiently to position said adapter at said at least one station.

4,046,499

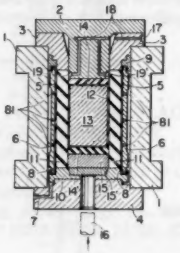
DRY RUBBER COMPRESSION MOLDING APPARATUS

Shinroku Saito, Yokohama, Japan, assignor to Shinagawa Firebrick Co., Ltd., Tokyo, Japan

Division of Ser. No. 389,053, Aug. 16, 1973, Pat. No. 3,956,452. This application Jan. 14, 1976, Ser. No. 648,858

Int. Cl.² B30B *5/02, 11/02;* **B28B** *7/12, 7/06*

U.S. Cl. 425—405 H **4 Claims**



1. In a dry type isostatic molding apparatus comprising a rigid cylindrical metallic spacer disposed coaxially inside of a cylindrical high pressure container, said spacer having a plurality of holes in its cylindrical surfaces for allowing pressurized liquid to enter the inside of the spacer, an isostatic liquid chamber being defined between the outer cylindrical surface of said spacer and the inner wall face of said container, a shaping rubber mold disposed coaxially inside said spacer, and lids firmly fixed at the upper and lower parts of said container, said upper and lower lids and said shaping rubber mold defining a sealed molding chamber for housing powders which are formed into a molded body by the apparatus, the improvement wherein said apparatus is provided with means for introducing and supplying pressurized gas between the inner peripheral surface of said shaping rubber mold and the outer peripheral surface of said molded body.

4,046,500

PRESS SPAR FOR HEATED PANEL PRESS

Heinrich Pfeiffer, Eppingen, Germany, assignor to Maschinenfabrik J. Dieffenbacher & Co., Eppingen, Germany

Continuation-in-part of Ser. No. 486,375, July 8, 1974, Pat. No. 3,998,580. This application Dec. 29, 1975, Ser. No. 645,213

Claims priority, application Germany, Dec. 30, 1974, 2431862

Int. Cl.² B29C *3/00*

U.S. Cl. 425—407 **17 Claims**

1. In a heated panel press for the production of pressed, composite panels such as chipboard panels, fiber panels and the

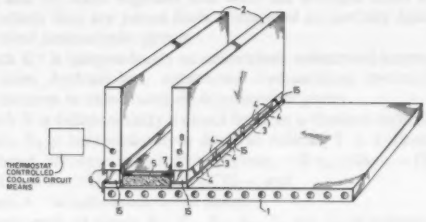
like, in which the work is pressed between opposing, heatable and coolable horizontal pressure plates mounted on upper and lower press spars, respectively, of which at least one is vertically movable, a press spar structure comprising in combination:

at least two upright press spar members to which the associated horizontal pressure plates are operatively connected;

a heat barrier in the form of a pressure resistant insulating bank interposed between the back surface of each pressure plate and a pressure transmitting end face of the associated upright press spar member; and

at least one metallic shroud member encasing the insulating bank where it engages the pressure plate, so that relative horizontal displacements between the upright member and its pressure plate which are generated during operation take place between said shroud members and the pressure plate; and wherein

each insulating bank includes a succession of insulating pressure blocks and at least one steel pressure block interposed between insulating pressure blocks, for the transmission of elevated pressures between the pressure plate and the press spar structure.

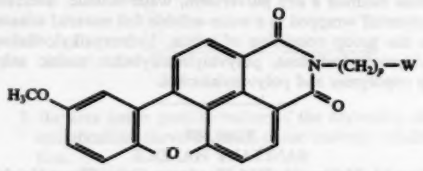


4,046,501
PROCESS FOR THE DYEING AND PRINTING OF SYNTHETIC POLYAMIDES

Joachim Otten, Offenbach am Main, and Helmut Troster, Konigstein, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sept. 30, 1975, Ser. No. 618,221
Claims priority, application Germany, Oct. 2, 1974, 2446989
Int. Cl.[2] D06P 1/382
U.S. Cl. 8—1 E 4 Claims

1. A process for the dyeing and printing of a fiber material on the basis of synthetic polyamides, which comprises using a dyestuff of the formula



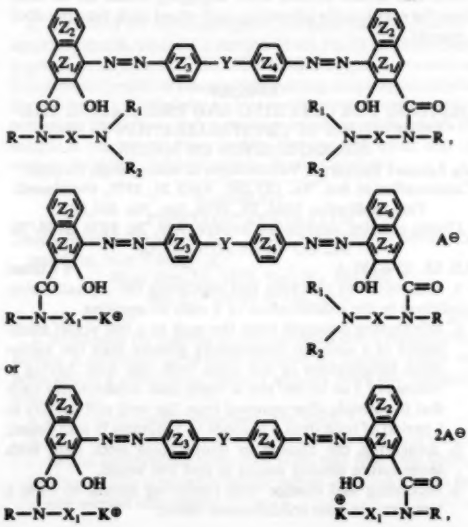
wherein p is 1, 2, 3, 4, 5 or 6, W is sulfo, sulfato, thiosulfato, carboxy, phosphato, $PO(OH)_2$ or $—PO(OR)(OH)$, wherein R is alkyl of 1 to 4 carbon atoms.

4,046,502
BASIC DISAZO DYES HAVING TWO 2-HYDROXY-3-SUBSTITUTED CARBAMOYLNAPHTHYL-1-AZOPHENYL GROUPS FOR DYEING PAPER

Helmut Moser, Reinach, and Hans von Tobel, Rieben, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 418,451, Nov. 23, 1973, abandoned, which is a continuation of Ser. No. 95,336, Dec. 4, 1970, abandoned. This application Dec. 17, 1975, Ser. No. 641,485
Int. Cl.[2] D21H 1/46
U.S. Cl. 8—7 18 Claims

1. In a process for the production of colored paper comprising (A) incorporating a dye composition into paper stock and forming paper from said paper stock or (B) applying a dye composition to paper sheet, the improvement wherein said dye composition is or comprises a dye of the formula



wherein each

R, R_1 and R_2 is independently hydrogen, hydrocarbyl or substituted hydrocarbyl or

R_1 and R_2 taken together and with the nitrogen atom to which they are joined form a saturated or partially saturated heterocyclic group,

each K^+ is independently an ammonium, substituted ammonium, hydrazinium, substituted hydrazinium, cycloimmonium or substituted cycloimmonium group,

each X is independently a direct bond or a divalent radical,

each X_1 is independently a divalent radical, Y is a direct bond, alkylene, substituted alkylene, —S—, —O—, —N—H—CO—NH— or —CH=CH—, and

each A^- is independently an anion,

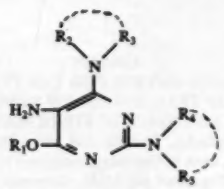
wherein each of Rings Z_1, Z_2, Z_3, Z_4, Z_5 and Z_6 is independently further unsubstituted or further substituted.

4,046,503
DEVELOPER-COUPLER HAIR DYES BASED ON ALKOXY-TRIAMINO-PYRIMIDINES

Hans Peter Kubersky, Solingen, Germany, assignor to Henkel & Cie GmbH, Dusseldorf, Germany

Filed Apr. 5, 1976, Ser. No. 673,457
Claims priority, application Germany, Apr. 12, 1975, 2516117
Int. Cl.[2] A61K 7/13
U.S. Cl. 8—10.2 15 Claims

1. A composition of the developer-oxidizer type for the dyeing of hair, consisting essentially of, as developer, a water-soluble triamino C_{1-4} alkoxy pyrimidine of the formula:



wherein R_1 represents C_{1-4} alkyl; R_2, R_3, R_4 and R_5 each represent the same or different substituents selected from the group consisting of hydrogen, C_{1-4} alkyl, C_{1-4} hydroxyalkyl, phenyl, C_{1-4} alkylphenyl, phenyl-C_{1-4} alkyl, and C_{1-4} alkoxyphenyl, and wherein R_2 and R_3, or R_4 and R_5 together form a divalent linking member selected from the group consisting of butylene, pentylene, azabutylene, and oxabutylene, or the water-soluble salts thereof, and a water-soluble coupler therefor, said developer and said coupler being present in the molar range of 2:1 to 1:2.

2. An aqueous emulsion for the dyeing of hair having a content of 0.2% to 5% by weight of the developer-coupler composition of claim 1.

4,046,504
PROCESS FOR PREPARATION OF COLORED SUEDE SHEET MATERIALS

Osamu Fukushima, Okayama, Japan, assignor to Kuraray Co., Ltd., Kurashiki, Japan

Filed Oct. 20, 1975, Ser. No. 624,133
Claims priority, application Japan, Oct. 23, 1974, 49-122233
Int. Cl.[2] D06P 7/00
U.S. Cl. 8—17 11 Claims

1. A process of preparing suede sheet materials having desirable tactile characteristics and good coloring comprising the steps of:

a. coloring fibers throughout with dope dyes;

b. forming said colored fibers into a fibrous mat;

c. impregnating said mat with a binder composed mainly of an elastomer;

d. treating said impregnated mat to form a napped surface

thereon, the size of the fibers in the resulting nap ranging from 0.1 to 0.0005 denier; and

e. dyeing the napped sheet material.

4,046,505

POST DYEING RESIN PARTICLES FIXED TO RESIN BASE

Malcolm Carnie Cobb, and Pamela Elliott, both of Pontypool, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 813,741, April 4, 1969. This application July 31, 1972, Ser. No. 276,294

Claims priority, application United Kingdom, Apr. 8, 1968, 16855/68; Aug. 16, 1968, 39269/68

Int. Cl.² D06P *1/52*

U.S. Cl. 8—18 R **3 Claims**

1. A process for producing a decorative structure which comprises applying thermoplastic polymer particles to a polymeric substrate material having a different dye substantivity from said particles, heating to fix the particles to said material and subsequently dyeing the resulting product to colour the polymer particles and give the same a different colour effect from said substrate material.

4,046,506

PROCESS AND DEVICE FOR THE CONTINUOUS DYEING OF TEXILE WEBS OF SYNTHETIC OR MOSTLY SYNTHETIC FIBRE MATERIALS

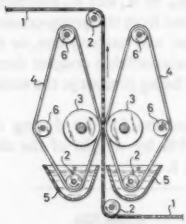
Erich Feess, Hofheim, Taunus, and Hans-Peter Maier, Sulzbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 16, 1975, Ser. No. 541,564

Claims priority, application Germany, Jan. 18, 1974, 2402328

Int. Cl.² D06P *3/82*

U.S. Cl. 8—21 R **3 Claims**



1. A process for the continuous dyeing of a textile web consisting of or containing a major portion of synthetic fibers, by padding the fibrous material with an aqueous dye liquor followed by reducing the moisture content of the web so treated and subsequently fixing the dyestuff, which comprises contacting said textile web soaked with dye liquor, while said web passes through the nip of a pair of squeezing rollers of a padding apparatus in a sandwich-like manner with two endless belts of an absorbent fiber material which envelop the said textile web from both sides and are likewise soaked by dye liquor, squeezing the web between said two layers of absorbent fiber material and continuing said sandwich contact between web and absorbent fiber material for a further time before proceeding with said dyeing operation.

4,046,507

COMMERCIAL PACKAGES CONTAINING DYESTUFFS

Hans Heini Zweifel, Binningen; Arthur Buehler, Rheinfelden, and Alfred Fasciati, Bottmingen, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 294,036, Oct. 2, 1972, abandoned, which is a continuation of Ser. No. 112,807, Feb. 4, 1971, abandoned. This application Sept. 12, 1975, Ser. No. 612,820

Claims priority, application Switzerland, Feb. 6, 1970, 1776/70

Int. Cl.² D06P *3/66*

U.S. Cl. 8—79 **6 Claims**

1. A process for the preparation of an aqueous dyebath or aqueous printing paste, comprising the step of adding to the aqueous medium a dry pulverulent, water-soluble, fiberreactive dyestuff wrapped in a water-soluble foil material selected from the group consisting of mucin, hydroxyalkylcellulose, carboxymethylcellulose, polyvinylmethylether/maleic anhydride copolymer and polyvinylalcohol.

4,046,508

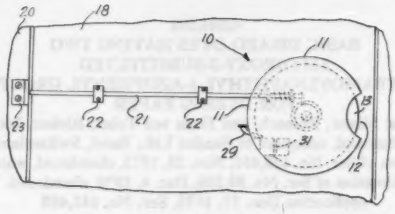
SANITARY HANDLE

William M. McDonald, 7116 Woodmore Oaks, Citrus Heights, Calif. 95610

Filed June 16, 1976, Ser. No. 696,553

Int. Cl.² A61L *3/00*

U.S. Cl. 21—77 **4 Claims**



1. A sterilized door handle apparatus comprising a housing secured to a door and having an aperture in one side thereof, a wheel rotatably mounted in said housing and having a portion thereof graspable through said aperture for opening the door, means in said housing engaging said wheel for coating said wheel with sterilizing liquids, means in said housing adjacent said last named means for removing excess liquid from said wheel, and means on said door engaging means on its door frame for rotationally advancing said wheel each time the door is opened.

4,046,509

METHOD FOR CHECKING AND REGULATING THE CONDITIONS OF CRYSTALLIZATION IN THE SOLIDIFICATION OF MELTS

Stig Lennart Backerud, Vallmovagen 3, Akersberga, Sweden

Continuation of Ser. No. 137,260, April 26, 1971, abandoned. This application Mar. 15, 1976, Ser. No. 666,582

Claims priority, application Sweden, Apr. 28, 1970, 5755/70

Int. Cl.² G01N *31/00, 33/00*

U.S. Cl. 23—230 A **4 Claims**

1. A method for checking and regulating the crystallization conditions in the solidification of a melt comprising

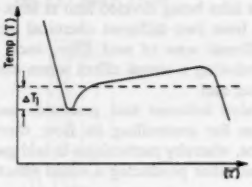
a. transferring a sample from the melt to a test vessel maintained at a uniform temperature greater than the nucleation temperature of the melt with the melt having a volume of 5 to 50 cm^3 and a vessel heat conductivity such that the sample after removal from the melt will solidify in a period of time from 5 seconds to 5 minutes in said vessel,

b. measuring the change in temperature with time with temperature sensing means in said test vessel,

c. recording said change with recording means, to form a temperature-time solidification curve,

d. comparing at least one of the following characteristic conditions in the recorded temperature-time solidification curve with a corresponding temperature-time solidification curve obtained by the solidification of a melt with known crystallization conditions of morphology and size and substantially the same chemical composition, viz.,

1. the slope of the temperature-time solidification curve at the primary plateau temperature,



2. the area under positive values of the derivative of the solidification curve at multi-phase eutectic solidification,

e. analyzing said corresponding solidification curve and at least one of the characteristic conditions to determine deviations and

f. correcting said melt from which the sample is taken if (e) reveals an unacceptable deviation from said corresponding solidification curve.

4,046,510

METHOD AND AN APPARATUS FOR DETERMINING THE INORGANIC CARBON CONTENT OF A LIQUID

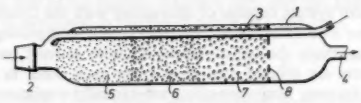
Wolf-Jurgen Becker, Leverkusen; Jacques Deprez, Frechen, and Horst Lehnert, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 27, 1976, Ser. No. 708,945

Claims priority, application Germany, Aug. 2, 1975, 2534620

Int. Cl.² G01N *31/12, 33/18*

U.S. Cl. 23—230 R **8 Claims**



1. A method for determining the inorganic carbon content of aqueous liquids, wherein a sample of the liquid to be analysed, together with a carbon dioxide-free carrier gas, is introduced into a heated reaction chamber containing as a reagent crystalline potassium bisulphate and/or a mixture of equal parts of potassium bisulphate and potassium sulphate, with which the sample is reacted to form carbon dioxide and water and the carbon dioxide is fed to a carbon dioxide analyser.

4,046,511

PIPETTOR APPARATUS

James Stabile, Scarsdale, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 16, 1975, Ser. No. 587,202

Int. Cl.² G01N *33/16, 1/14*

U.S. Cl. 23—259 **3 Claims**

1. Apparatus for loading liquid materials into a rotatable disc having a plurality of cavities adapted to contain liquid and arranged in a plurality of radially aligned rows said apparatus comprising:

i. a first horizontally disposed cam shaft,

ii. a second horizontally disposed cam shaft arranged parallel to and horizontally separated from said first cam shaft,

iii. electrically actuatable motor means engaged to said first and second cam shafts,

iv. a first vertically disposed shaft arranged at a position substantially in-line with the axis of rotation of said second cam shaft and spaced adjacent from said first cam shaft, said first vertically disposed shaft being rotatably moveable about its vertical axis,

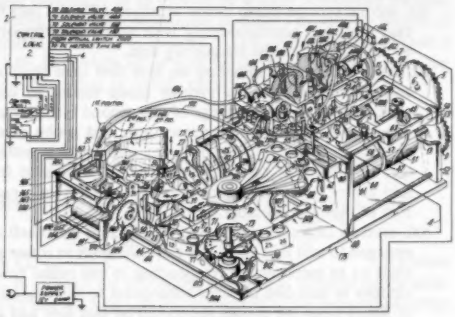
v. a disc member removeably affixed to said vertical shaft and rotatable therewith, said disc member having a plurality of cavities adapted to contain liquid, said cavities being arranged in a plurality of equi-spaced radial rows,

vi. reservoir means adapted to contain liquid reagent positioned adjacent said disc member,

vii. an annular ring member fixedly positioned with respect to and surrounding said disc member, said ring member having a plurality of receptacles adapted to contain serum, said receptacles being in radial alignment with said radial rows of said disc member,

viii. a second vertically disposed shaft arranged adjacent said first vertically disposed shaft, said second vertically disposed shaft being reciprocally rotatably moveable about its vertical axis and being vertically moveable up and down,

ix. a first probe supporting arm fixedly attached to said second vertically disposed shaft, said first probe supporting arm being arranged such that a probe supported thereon can be moved from a position above said reagent liquid reservoir to a position above an initial selected radial row of said disc member and back to a position



above said liquid reagent reservoir upon reciprocal rotatable movement of said second vertically disposed shaft,

x. a first cam mounted on said first cam shaft and engaged to said second vertically disposed shaft to lower and raise said shaft and said first probe supporting arm when the probe supported by said arm is positioned over said reagent reservoir to cause said probe, when lowered, to be immersed in liquid reagent in said reagen reservoir and to subsequently lower and raise said first probe supporting arm when the probe supported by said arm is positioned over said initial selected radial row of said disc member to cause said probe, when lowered, to be within a cavity of said selected radial row,

xi. a second cam member mounted on said first cam shaft and engaged to said second vertically disposed shaft to reciprocally rotate said second vertically disposed shaft and said first probe supporting arm from an initial position in which the probe supported by said arm is above said liquid reagent reservoir to a second position in which said probe is above said initial selected radial row of said disc member and back to its said initial position,

xii. a horizontally, moveably mounted block arranged above said second cam shaft,

xiii. a second probe supporting arm pivotally mounted on said horizontally moveable block and arranged to be rotatably moveable up and down in a vertical plane,

xiv. a rinse liquid containing reservoir arranged adjacent said second cam shaft,

xv. a third cam mounted on said second cam shaft and en-

gaged to said horizontally moveable block to move said second probe supporting arm such that the probe supported thereby is moved in sequence from (*a*) an initial position in said rinse liquid reservoir to (*b*) a position within a said receptacle of said ring member to (*c*) a position within a cavity of a radial row of said disc member and (*d*) back to its initial position within said rinse liquid reservoir,

xvi. a fourth cam mounted on said second cam shaft and engaged to said pivotally mounted second probe supporting arm to move said second probe supporting arm such that the probe supported thereby is raised during sequence (*a*) of (xv) above, lowered during sequence (*b*) of (xv) above, raised subsequent to sequence (*b*) lowered during sequence (*c*) of (xv) above raised subsequent to sequence (*c*) of (xv) above and lowered during sequence (*d*) of (xv) above,

xvii. first syringe pump means arranged adjacent said first cam shaft and communicating with a said probe supported by said first probe supporting arm,

xviii. fifth cam means mounted on said first cam shaft and engaged to said first syringe pump means to cause relative movement of the syringe of said first syringe pump means such that liquid reagent is drawn into a said probe of said first probe supporting arm when said probe is immersed in liquid reagent in said reagent reservoir and dispensed from said probe when said probe is within a cavity of a selected radial row of said disc member,

xix. second syringe pump means arranged adjacent said first cam shaft and communicating with said probe supported by said second probe supporting arm,

xx. sixth cam means mounted on said first cam shaft and engaged to said second syringe pump means to cause relative motion of the syringe of said second syringe pump means such that serum is drawn into said probe of said second probe supporting arm when said probe is within a said receptacle of said ring member and dispensed from said probe when said probe is within a cavity of a radial row of said disc member,

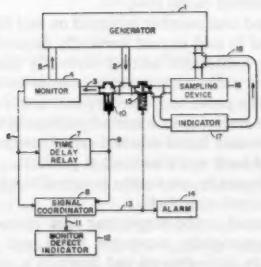
xxi. seventh cam means mounted on said first cam shaft and engaged to said first vertically disposed shaft to rotate said shaft by an increment corresponding to one radial row of cavities of said disc member subsequent to the dispensing of liquid from the probes supported by said first and second probe supporting arms.

4,046,512

DEVICE FOR INDICATING OVERHEATING IN GENERATORS

Thomas D. Kaczmarek, and David C. Phillips, both of Penn Hills, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 20, 1976, Ser. No. 659,868
Int. Cl.² B01D *50/00*; G01N *31/22*
U.S. Cl. 23—253 TP **7 Claims**



1. In combination,

A. a generator having a cooling gas stream passing therethrough;

B. an indicator device for indicating the presence of particulates in said gas stream comprising

1. a filter holder having a gas inlet and a gas outlet, connected so that at least a portion of said cooling gas stream can pass therethrough;

2. a gas-permeable, particulate-collecting filter within said filter holder, the surface of said filter which faces said gas inlet being divided into at least two areas; and

3. at least two different chemical indicators, each on a different area of said filter, each chemical indicator producing a visual effect when contacted by particulates; and

C. a valve between said generator and said cooling gas stream for controlling its flow through said indicator device, whereby particulates in said gas stream can collect on said filter producing a visual effect.

4,046,513

PRINTED REAGENT TEST DEVICES AND METHOD OF MAKING SAME

Leighton Clifford Johnson, Edwardsburg, Mich., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed June 30, 1976, Ser. No. 701,403
Int. Cl.² A61K *9/70*; B05D *5/00*; G01N *31/22, 33/16*
U.S. Cl. 23—253 TP **12 Claims**

1. In a test device for determining the presence of a constituent in a sample in which a carrier matrix is incorporated with a reagent system capable of interacting with the constituent to produce a detectable response, said system comprising at least two reactants, the improvement wherein at least two of the reactants are printed separately from each other in substantially discrete, non-contacting, substantially coplanar areas of the carrier matrix.

4,046,514

TEST DEVICE AND METHOD FOR DETERMINING A COMPONENT IN A SAMPLE

Katharine Gentry Johnston, Elkhart, and Melvin Dee Smith, Wakarusa, both of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Nov. 24, 1976, Ser. No. 744,703
Int. Cl.² G01N *33/16, 31/14, 21/06*
U.S. Cl. 23—253 TP **29 Claims**

1. In a test device for determining a component in a sample, wherein a carrier matrix is incorporated with a reactant system comprising at least one ingredient, said reactant system being capable of producing a detectable response upon contact with said sample component,

the improvement in which said matrix is a cloth comprising longitudinal and transverse filaments, at least an effective number of said transverse filaments being the only fila-

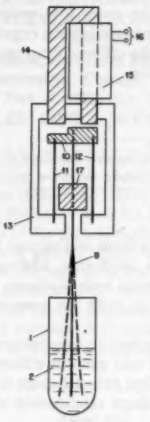
ments in the matrix incorporated with at least one of said reactant system ingredients.

4,046,515

DILUTING AND AGITATING DEVICE

Jan de Leeuw, Mistelvagen 9, Akersberga, Sweden

Filed Mar. 9, 1976, Ser. No. 665,291
Claims priority, application Sweden, Mar. 27, 1975, 7503588
Int. Cl.² B01F *11/04*
U.S. Cl. 23—259 3 Claims



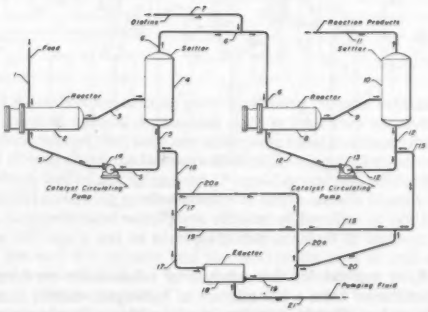
1. Apparatus for dispensing a liquid into a succession of test tubes, or similar vessels, and for agitating liquid in the test tubes, comprising a pipette and an elongated wire agitator, supporting means for the pipette and said agitator including driving means and journalling means for positioning one end of the agitator for transverse vibratory movement in the liquid in a test tube, said one end being disposed below the level of the discharge end of the pipette, whereby only said one end of the agitator is immersed in the liquid while in a test tube.

4,046,516

HYDROGEN FLUORIDE-CATALYZED ALKYLATION APPARATUS

Vance P. Burton, Arlington Heights, and Michael Z. Mikulicz, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 645,122
Int. Cl.² B01J *1/00*; C07C *3/54*
U.S. Cl. 23—288 E 1 Claim



1. An alkylating apparatus comprising a first reactor and a first settler communicating therewith, a second reactor, a second settler communicating with the second reactor, means for passing liquid from the upper portion of the first settler to the second reactor, a first catalyst recirculating conduit between said first settler and said first reactor, a second catalyst recirculating conduit between said second settler and said second reactor, an eductor, first conduit means connecting said first recirculating conduit with the inlet end of said eductor, second conduit means connecting the outlet end of the eductor with said second recirculating conduit, an additional conduit connecting said second conduit means with said first conduit means, and a separate conduit connecting said second conduit means with said first conduit means, whereby said additional conduit and said separate conduit provide means by which catalyst may be moved from said first catalyst recirculating conduit to said second catalyst recirculating conduit, or vice-versa, to enable selective adjustment of the catalyst inventory in the first and second reactor-settler circuits.

4,046,517

CEMENTED CARBIDE MATERIAL FOR CUTTING OPERATION

Yasuyuki Soga, Kobe, Japan, assignor to Ltd. Dijet Industrial Co, Osaka, Japan

Filed May 30, 1975, Ser. No. 582,334
Claims priority, application Japan, Feb. 14, 1975, 50-18981
Int. Cl.² C22C *29/00*; C04B *35/56, 35/58*
U.S. Cl. 428—539.5 11 Claims

1. A cemented carbide material for cutting operations consisting essentially of 10 to 60% by weight of tungsten carbide, 5 to 40% by weight of titanium carbide, 5 to 30% by weight of tantalum carbide, 3 to 20% by weight of titanium nitride and 5 to 20% by weight of an iron family metal selected from the group consisting of cobalt, nickel and iron.

4,046,518

SOLID FUEL ELEMENT AND PROCESS OF MANUFACTURING

Charles J. Dalzell, 920 N. 6th Ave., Yakima, Wash. 98902

Filed Mar. 22, 1976, Ser. No. 668,942
Int. Cl.² C10L *5/00, 11/00*
U.S. Cl. 44—10 B 3 Claims

1. A method for producing a solid fuel element useful as an igniter in a solid fuel package comprising the steps of: blending approximately equal parts by weight of dry powdery wood particles at room temperature derived from the sawdust of cell bound moisture free compressed wood with refined liquid paraffin wax having a melting point of approximately 125° F. preheated to approximately 350° F. to an ultimate blended material temperature of approximately 250° F., thereby ridding the wood particles of free moisture and activating the molecules of the wood particles and liquid wax sufficiently to cause the wood particles to be completely saturated with the liquid wax, cooling the blended material while conveying it in a thin layer slowly through a cooling chamber until the blended material is at a temperature of approximately 56° F., milling the blended and cooled material, and then compacting the material in a rigid compression chamber under a pressure of approximately 22,000 psi to form a dry solid fuel element.

4,046,519

NOVEL MICROEMULSIONS

Alfred B. Piotrowski, Woodbury, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

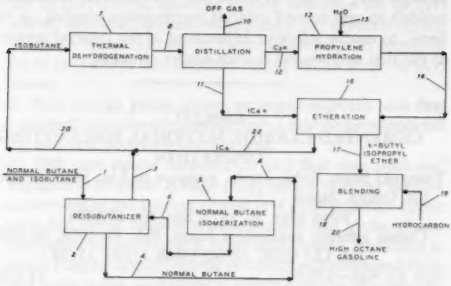
Filed Oct. 31, 1975, Ser. No. 627,725
Int. Cl.² C10L *1/32*
U.S. Cl. 44—51 2 Claims

1. A microemulsion comprising a mixture of gasoline, methanol and water and a surfactant blend having a hydrophile-lipophile balance value of about 4 wherein the surfactant blend comprises, by weight, a 9:1 mixture of mono and diglycerides of oleic acid: bis (2-hydroxyethyl)stearylamine oxide.

4,046,520
GASOLINE PRODUCTION

Jacob D. Kemp, El Cerrito, and Robert P. Sieg, Piedmont, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 306,117, Nov. 13, 1972, Pat. No. 3,904,384, which is a continuation-in-part of Ser. No. 31,300, April 23, 1970. This application June 9, 1975, Ser. No. 585,412
The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.
Int. Cl.[2] C10L *1/02*
U.S. Cl. 44—56 1 Claim



1. In a process for producing a high-octane gasoline by blending a hydrocarbon mixture of the gasoline range with an ether, the improvement which comprises:
a. thermally dehydrogenating-cracking isobutane to obtain a mixture of propylene and isobutene;
b. separating the mixture into an isobutene-rich stream and a propylene-rich stream;
c. hydrating with a solid acidic hydration catalyst the propylene-rich stream to obtain isopropanol;
d. etherating the isopropanol with the isobutene-rich stream to obtain t-butyl isopropyl ether; and
e. blending the t-butyl isopropyl ether with gasoline-boiling-range hydrocarbons.

4,046,521
DISTILLATE FUEL CONTAINING DEHAZING COMPOSITIONS

Donald U. Bessler, and Kenneth J. Tacchi, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Mar. 31, 1975, Ser. No. 563,649
Int. Cl.[2] C10L *1/18*
U.S. Cl. 44—62 11 Claims

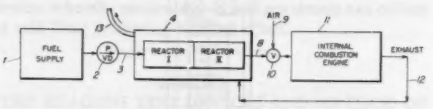
1. A fuel composition comprising a distillate fuel and a dehazing amount of the product of the process which comprises reacting a phenol-formaldehyde resin with an α-olefin epoxide having at least four carbon atoms and then reacting the product so obtained with a member of the group consisting of ethylene oxide, glycidol, propylene oxide and mixtures thereof, the reaction of said phenol-formaldehyde resin with said α-olefin epoxide and the reaction of the product so obtained with said member being carried out by heating the respective reaction mixtures.

4,046,522
PRE-ENGINE CONVERTER FOR USE WITH FUELS CONTAINING OXYGENATED COMPOUNDS

Nai Yuen Chen, Titusville, and Heinz Heinemann, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed June 25, 1976, Ser. No. 699,811
Int. Cl.[2] C10G *13/02*
U.S. Cl. 48—102 A 9 Claims

1. A pre-engine converter comprising:
a. two sequential reaction chambers;
b. a catalytic material in the first of said chambers that is effective to catalytically decompose oxygen-containing organic compounds to carbon monoxide and hydrogen;
c. a catalytic material in the second of said chambers that comprises a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least 12, a constraint index of 1 to 12, and a crystal density of not substantially below about 1.6 grams per cubic centimeter and is effective for catalytically cracking low octane normally liquid hydrocarbons to higher octane normally gaseous hydrocarbons;
d. means for introducing into said first chamber a liquid fuel comprising a low octane normally liquid hydrocarbon in mixture with one or more low molecular weight, high octane value, oxygen-containing organic compounds;
e. means for passing the effluent from said first chamber into said second chamber;

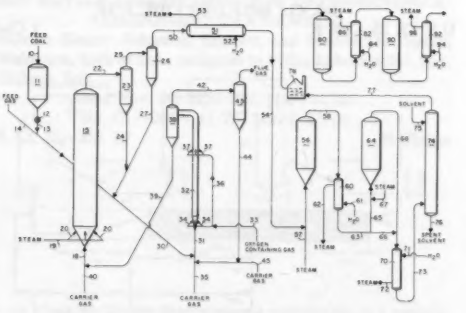


f. means for removing from said second chamber an effluent comprising carbon monoxide, hydrogen and higher octane normally gaseous hydrocarbons;
g. means for mixing air with the gaseous effluent from said second chamber;
h. means to introduce into an internal combustion engine the mixture of air and said gaseous effluent;
i. means to pass the hot exhaust gases from said engine into indirect heat exchange relationship with said pre-engine converter;
j. means enclosing said first and second reaction chambers and connected to said exhaust means whereby the heat from said hot exhaust gases emitting from said engine is transferred to said reaction chambers and the catalysts contained therein; and
k. means for venting said exhaust gases from said heat transfer means.

4,046,523
SYNTHESIS GAS PRODUCTION

Theodore Kalina, Morris Plains, N.J., and Roger E. Moore, El Paso, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 7, 1974, Ser. No. 512,592
Int. Cl.[2] C07C *9/04*
U.S. Cl. 48—197 R 3 Claims



1. A method for the removal of condensable tar-forming constituents from a hot mixture of hydrogen, carbon monoxide, carbon dioxide, methane, condensable tar-forming constituents, and steam withdrawn from a high temperature gasification zone without scrubbing said mixture with water or oil which comprises cooling said hot mixture of gases to a steam reforming temperature below the gasification temperature,

contacting the cooled gases at said reforming temperature with a steam reforming catalyst under low severity steam reforming conditions in a steam reforming zone in the presence of sufficient steam to reform said tar-forming constituents, withdrawing a hot gas stream substantially free of said tar-forming constituents from said reforming zone, and thereafter further treating said gas by shifting the hydrogen-to-carbon monoxide ratio and methanating the shifted gas.

4,046,524

LAPPING COMPOSITIONS COMPRISING AN ALUMINUM, DIALKYL ORTHOPHOSPHATE GELLING AGENT

Jan Willem van Hesden, Baulkham Hills, Australia, assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 6, 1975, Ser. No. 629,340
Int. Cl.² C09K *3/14*; C10M *1/46*
U.S. Cl. 51—306 **7 Claims**

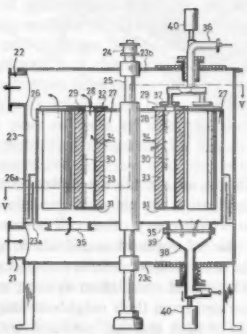
1. A gelled hydrocarbon composition for use in lapping operations comprising a liquid hydrocarbon having a Brookfield viscosity of less than about 200 cps and a flash point above about 100° F, from about 0.1 to about 10% by weight based on liquid hydrocarbon of the pseudo double salt of an alkyl orthophosphoric acid as a gelling agent, said pseudo double salt being the product of the neutralization of an acidic non-stoichiometric aluminum salt of an alkyl orthophosphoric acid with a base selected from the group consisting of ammonia and basic compounds of alkali metals and alkaline earth metals, and from about 0.1 to about 20 lbs. of a lapping abrasive per gallon of liquid hydrocarbon.

4,046,525

METHOD FOR ADSORBING HARMFUL SUBSTANCE

Tatsuki Matsuo, and Teruo Kohata, both of Otsu, Japan, assignors to Toyobo Co., Ltd., Osaka, Japan

Filed July 31, 1975, Ser. No. 600,788
Claims priority, application Japan, Feb. 26, 1975, 50-24393
Int. Cl.² B01D *53/00*
U.S. Cl. 55—59 **6 Claims**



1. A method for treating gases containing harmful substance by using an apparatus provided with at least two adsorptive units composed of at least one adsorptive tubular element made of a fibrous sheet of adsorptive material having a 0.1 m/second pressure loss of not more than 15 mm Aq/cm, said adsorptive material consisting predominantly of active carbon fibers having an equilibrated adsorption amount of benzene of not less than 300 mg/g and an adsorption rate constant of benzene of not less and 0.2 /minute, and the ratio of the area of said adsorptive material to the area of the unit frame being not less than 2, which comprises

passing gases contaminated with the harmful substances through the adsorptive element in one of said adsorptive units, thereby adsorbing the harmful substances with said adsorptive material to recover a purified gas, and

forcibly passing a heated purging gas through the adsorptive element in another one of the adsorptive units where the harmful substance had been previously adsorbed, said heated purging gas being jetted from a heated purging gas jetting device provided at the upper part of the adsorptive element in said another adsorptive unit, whereby the harmful substance-adsorbed by the adsorptive element is heated and desorbed,

said adsorptive units being sequentially used for adsorption and desorption, respectively

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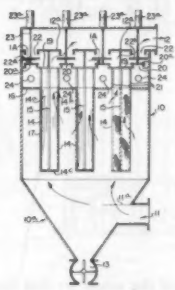
4,046,526

BAG COLLECTOR FOR DIRT WITH SELECTIVE HALF-BAG CLEANING

John F. Phillippi, Mentor, Ohio, assignor to Aerodyne Development Corporation, Cleveland, Ohio

Filed Jan. 12, 1976, Ser. No. 648,093
Int. Cl.² B01D *46/04*
U.S. Cl. 55—96 **13 Claims**



1. A method of cleaning bag collectors of dirt particles wherein a plurality of elongated tubular porous bags are arranged in a bag housing with their longer dimensions parallel and in a straight line side by side with means for passing a dirty stream of gas simultaneously through said bags radially inwardly, thus collecting dirt on the outer faces of said bags, means for discharging the clean stream of gas at an open end of said bags, A substantially impervious linear partition in the middle of each bag normal to said straight line dividing the inside of each bag into two non-communicating half portions extending from end to end of each bag and beyond said open ends of said bags to said means for discharging said clean stream of gas; comprising selectively closing said clean gas discharging means of two adjacent half portions of two of said bags, and selectively passing a cleansing stream of gas into the interior of said selected two adjacent half portions under sufficient pressure to pass outwardly through said two adjacent half portions and dislodge the dirt collected on the outer faces of said two adjacent half portions, while continuing to collect dirt particles on the other half portions of said two bags whereby the space between said two selected half portions is relatively quiescent and said dislodged dirt falls downwardly.

4,046,527

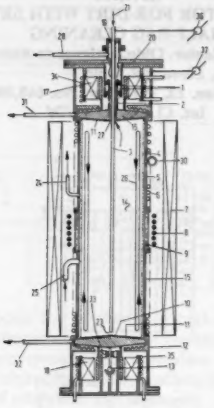
APPARATUS FOR THE STABLE CONFINEMENT OF AN IONIZED GAS COLUMN INSIDE A MAGNETIC FIELD

Jacob Kistemaker, Amsterdam, Netherlands, assignor to Ultracentrifuge Nederland N.V., The Hague, Netherlands

Filed Feb. 8, 1974, Ser. No. 440,752
Claims priority, application Netherlands, Feb. 15, 1973, 7302102
Int. Cl.² B03C *1/00*
U.S. Cl. 55—100 **8 Claims**

1. Apparatus for the stable confinement of a fast rotating gaseous mixture of heavy gas component and a light gas component comprising: an elongated vessel having a wall of circu-

lar cross section; means for cooling the vessel; at least one supply pipe for supplying a gaseous mixture of heavy and light components to the interior of the vessel; means spaced from the vessel wall for imparting rapid rotation to the gas in the center of the vessel so that the heavy gas component, by means of a high pressure gradient caused by centrifugal forces, moves to the inside of the vessel wall and so that the light gas component forms a central gas column extending axially in the vessel, means in said vessel for ionizing the gas column, means about said vessel for inducing an axial stationary magnetic field ex-



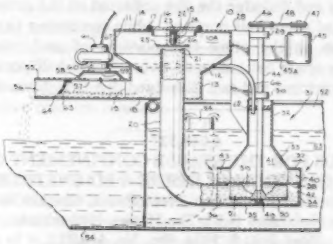
tending the length of the vessel so that the gas in the vessel is subjected to the field, and means within the vessel including an electrode electrically insulated from and adjacent the vessel wall for producing a radial electrical potential between the ionizing means and the vessel wall by rendering the gas column anodic and the vessel cathodic; means for flowing the heavy gas component in the form of a gas envelope axially along the vessel wall and then a gas column axially in an opposite direction; discharge pipes adjacent the ends of the vessel for separately removing the heavy and light component respectively.

4,046,528

DEGASSING SYSTEM

Walter E. Liljestrand, Midland, Tex., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Apr. 28, 1975, Ser. No. 572,220
Int. Cl.[2] B01D *19/00*
U.S. Cl. 55—160 **17 Claims**



1. In a system for degassing fluids, the combination comprising:

a degassing vessel having an inlet and an outlet, said outlet being disposed substantially at the bottom of said vessel and including an outlet conduit forming a common discharge from said vessel for said fluid and gas disengaged in said vessel;

means connected to the inlet of said degassing vessel for introducing fluid under pressure into said vessel;

means connected to said outlet conduit for exhausting gas disengaged from said fluid in said vessel; and

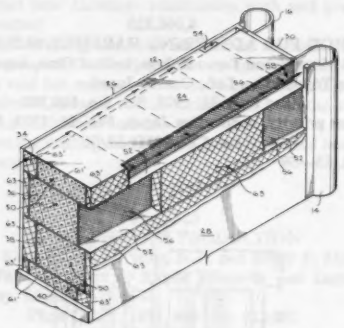
means for substantially preventing introduction of air into said vessel through said outlet conduit.

4,046,529

REGENERABLE DEVICE FOR SCRUBBING BREATHABLE AIR OF CO_2 AND MOISTURE WITHOUT SPECIAL HEAT EXCHANGER EQUIPMENT

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Edward H. Tepper, Granby, Conn.

Filed May 21, 1976, Ser. No. 688,854
Int. Cl.[2] B01D *53/02;* F28F *3/02*
U.S. Cl. 55—179 **4 Claims**

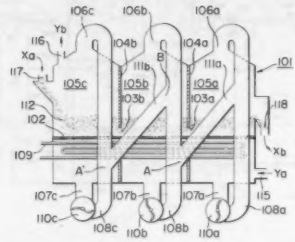


1. In a breathable air circulation system a module for the control and purification of air, said module comprising an array of cells in which every other cell is connected in common to a first pair of opposed manifolds in said circulation system while the intermediate cells are connected to a second pair of manifolds in said circulation system, said cells in the array being separated from their neighbors only by an airsealing parting sheet of high thermal conductivity, each said cell being filled with a foamed metal comprising a continuous phase of metal wire of high heat conductivity defining a mass of sub-cells or small spaces forming a second continuous phase, a filling of granular material in at least the major portion of said foamed metal, such that the air flowing through said cell must flow through said granular material within the foamed metal, said granular material being sorbent to carbon dioxide at standard temperature and pressure but not to other gases in the air other than water vapor and also being desorbent to carbon dioxide and moisture at standard temperatures and vacuum pressures, and means in each cell between the connections of each cell to said manifolds to present the untoward leakage of said granules into said manifolds, said foamed metal in each cell contacting said parting sheets for the passage of heat therethrough and providing the principal structural strength for the cell.

4,046,530
MULTI-STAGE FLUIDIZED-BED ACTIVATED CARBON REGENERATION APPARATUS

Masanori Izumo, Neyagawa, and Sigeru Nakakita, Takatsuki, both of Japan, assignors to Daikin Kogyo Co. Ltd., Osaka, Japan

Filed Mar. 31, 1976, Ser. No. 672,482
Claims priority, application Japan, Apr. 4, 1975, 50-41503; Apr. 18, 1975, 50-47852
Int. Cl.[2] B01J 9/18; B01D 53/08
U.S. Cl. 55—181 10 Claims



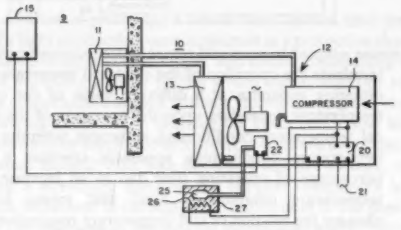
1. An apparatus for the fluidizing regeneration of activated carbon having adsorbed organic contaminants therein comprising:
- a housing;
- a horizontal grid disposed within said housing;
- a port for supplying activated carbon to be treated and a regenerating gas discharged port, both of which are provided in the upper portion of one end wall of said housing;
- a regenerating gas supply port provided in a lower portion of the other end wall of said housing;
- a regenerated activated carbon discharge port provided in a lower portion of the other end wall and at a higher portion than said grid;
- a plurality of chambers defined by one or more vertical partitioning walls each having an opening through which activated carbon flows, said opening being above said grid and said plurality of chambers each having a top outlet port and a bottom inlet port;
- a circulating path joining said top outlet port and said bottom inlet port of each of said plurality of chambers, thereby constituting a regeneration gas circulating system for each respective chamber, said circulating system being equipped with a blower and a heat exchanger whereby a portion of said regenerating gas is recirculated within the chamber; and
- a gas passage for communicating each of the neighboring circulating systems whereby a portion of said regenerating gas is introduced directly from one chamber to the neighboring chamber.

8. An apparatus for the fluidizing regeneration of activated carbon having adsorbed therein organic contaminants comprising;
- a housing;
- a horizontal grid disposed in said housing;
- a port for supplying activated carbon to be treated and a regenerating gas discharge port, both of which are provided in upper portions of one end wall of said housing;
- a regenerating gas supply port provided in a lower portion of the other end wall of said housing;
- a regenerated activated carbon discharge port provided in a lower portion of the other end wall of said housing and at a higher portion than said grid;
- one or more vertical partitioning walls extending from the ceiling of the housing to the bottom thereof, thereby partitioning the interior of the housing into a plurality of chambers, said partitioning walls each having an opening through which activated carbon flows, each opening being above said grid and a regenerating gas passage in a portion near the top of the housing;
- a top outlet port and a bottom inlet port both provided in each of said plurality of chambers;
- a plurality of regenerating gas circulating path provided outside of the housing and respectively connecting the top outlet port and the bottom inlet port of respective chamber to constitute a circulating system; and
- a blower and a heat exchanger both provided in every circulating system consisting of one chamber and one circulating path.

4,046,531
REFRIGERATION LOAD SHEDDING CONTROL DEVICE

Lorne W. Nelson, Bloomington, and David J. Sutton, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed July 14, 1976, Ser. No. 704,880
Int. Cl.[2] G05D 23/30
U.S. Cl. 62—202 3 Claims



1. A control device for selectively disconnecting an electrical temperature conditioning load apparatus from a source of electrical energy to reduce the use of energy by the apparatus as the temperature conditioning load increases, comprising
- temperature responsive means adapted to be responsive to outdoor temperature, the magnitude of which determines the electrical load of the apparatus as upon an increase in the level of said outdoor temperature the use of electrical energy from the source by the electrical load apparatus increases,
- control means connected to said temperature responsive means, said control means being adapted to terminate the operation of the electrical load apparatus when the temperature reaches a predetermined value, and
- means connected to affect the output of said temperature responsive means to reset said control means depending upon the operation of the electrical load apparatus to terminate the operation of the electrical load apparatus at a different value of the outdoor temperature whereby as the electrical load apparatus operates a larger percentage of time due to a change in said outdoor temperature, said last mentioned means being affected when electrical load apparatus is energized.

4,046,532
REFRIGERATION LOAD SHEDDING CONTROL DEVICE

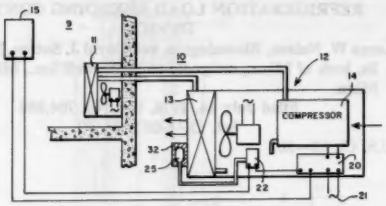
Lorne W. Nelson, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed July 14, 1976, Ser. No. 705,214
Int. Cl.[2] F25B 1/00
U.S. Cl. 62—215 6 Claims

1. A control device for selectively disconnecting an electrical temperature conditioning apparatus from a source of electrical energy to reduce the use of energy by the apparatus as the temperature conditioning load of a building increases, comprising

temperature responsive means adapted to be responsive to outdoor temperature, the magnitude of which primarily determines the electrical load of the temperature conditioning apparatus as upon a change in the level of said outdoor temperature the use of electrical energy from the source by the temperature conditioning apparatus increases,

control means connected to said temperature responsive means, said control means being adapted to terminate the operation of the electrical temperature conditioning apparatus when the temperature of said temperature responsive means exceeds a predetermined value, and



means adapted to reset said temperature responsive means to terminate the operation of the electrical temperature conditioning apparatus at a different value of the outdoor temperature depending upon the operation of the electrical temperature conditioning apparatus whereby as the temperature conditioning apparatus operates a larger percentage of operating time due to an increase in the temperature conditioning load, said means to reset changes the relation of said temperature responsive means on said control means to reduce said percentage of operating time as the temperature conditioning load increases.

4,046,533

REFRIGERATION WORKING FLUID CONTAINING BRANCHED CHAIN ALKYLBENZENE LUBRICANT

Sven A. Olund, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 423,835, Dec. 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 317,318, Dec. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 213,174, Dec. 28, 1971, Pat. No. 3,733,850, which is a continuation-in-part of Ser. No. 3,523, Jan. 16, 1970, Pat. No. 3,642,634. This application Jan. 26, 1976, Ser. No. 652,581

Int. Cl.² F25B 9/00; C09K 5/04

U.S. Cl. 62—468 **4 Claims**

1. In a refrigeration apparatus containing a working fluid consisting essentially of a refrigerant and a chemically inert, wax-free lubricant, said refrigerant being a halo-substituted hydrocarbon having from 1 to 3 carbon atoms and at least about 40% by weight of fluorine and said lubricant being an alkylbenzene, the improvement which comprises using as a lubricant a mixture of mono-substituted, branched chain alkylbenzenes having an average molecular weight in the range of about 300 to about 470, the alkyl groups of said alkylbenzenes being at least about 60% by weight polypropylene and having an average of at least 1 branch for every 4 carbons in the alkyl group, there being from 10 to 100 parts by weight of refrigerant per part by weight of lubricant and said polypropylene alkylbenzene mixture being produced by HF alkylation of benzene with mixed polypropylenes.

4,046,534

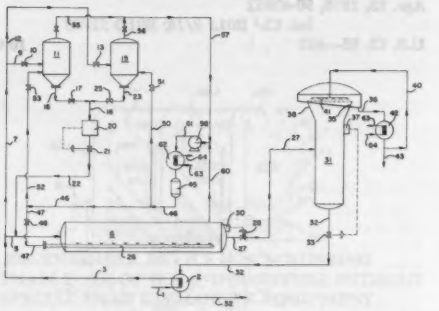
METHOD FOR RECOVERING FRESH WATER FROM BRINE

James B. Maguire, Sr., P.O. Box 795, Oceanside, Calif. 92054

Filed Apr. 26, 1973, Ser. No. 354,677

Int. Cl.² B01D 9/04

U.S. Cl. 62—534 **9 Claims**



1. A process for recovering fresh water from brine comprising:

A. cooling brine to about the freezing temperature,

B. maintaining two, batch nucleus-forming zones,

C. inoculating the brine with a predetermined number of nuclei of ice crystals, alternately from said two nucleus-forming zones,

D. passing the inoculated brine through an elongated crystal growth zone from an inlet at one end thereof to an outlet at the other end thereof,

E. supplying refrigerant to the crystal growth zone along substantially the entire path of flow of inoculated brine through the crystal growth zone at a rate such that the brine temperature in the crystal growth zone is from about 0.2° to about 3.0° F lower than the equilibrium freezing point of the brine at that point in the flow path, whereby crystal growth is effected substantially without the formation of nuclei,

F. passing the resultant brine-ice mixture from the outlet of the crystal growth zone to a separation zone wherein ice crystals are separated from brine,

G. washing the separated ice crystals with fresh water, and

H. recovering fresh water from the ice crystals.

4,046,535

GLASS MELTER HAVING REFLECTIVE TOP WALL AND METHOD FOR USING SAME

Charles J. Stalego, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 463,472, April 24, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,119

Int. Cl.² C03B 37/02

U.S. Cl. 65—1 **6 Claims**

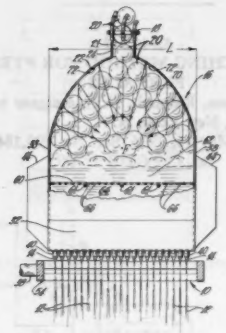
1. A feeder for supplying molten glass comprising:

a. sidewalls;

b. a bottom wall having at least one orifice for discharging molten glass;

c. a resistance element within said feeder to convert unmelted glass to a molten condition;

d. a top wall adapted to reflect vertically upwardly moving heat from molten glass in said feeder to a single focal point in said feeder above said resistance element; and,



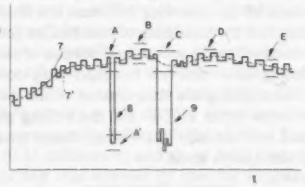
e. conduit means for introducing unmelted glass into said feeder.

4,046,536

MONITORING AND CONTROL OF OPTICAL FIBER DIAMETERS

David Harry Smithgall, Sr., East Windsor Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Aug. 13, 1976, Ser. No. 714,148
Int. Cl.[2] C03B *37/02*
U.S. Cl. 65—2 6 Claims



4. A method of monitoring the diameters of successive axial portions of an optical fiber, the method comprising the steps of:

a. illuminating the fiber with a radially directed beam of coherent, monochromatic radiation so as to create a forward scattering pattern;

b. advancing the fiber relative to the beam along the direction of the axis of the fiber;

c. generating a succession of counts of numbers of interference fringes within a predetermined portion of said pattern, each succeeding count being indicative of the diameter of a different axial portion of the fiber advanced relatively across said beam;

d. comparing the difference between each successive count and a last previous count which has been indicated as valid, with a predetermined, maximum allowable value of said difference for validity of said successive count; and

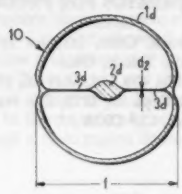
e. for each successive difference which is not greater than said maximum allowable value, indicating as valid the successive count associated with said difference.

4,046,537

METHOD FOR THE PRODUCTION OF ONE-MATERIAL OPTICAL FIBERS

Ulrich Deserno, and Franz Auracher, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 14, 1976, Ser. No. 676,678
Claims priority, application Germany, Apr. 15, 1975, 2516387
Int. Cl.[2] C03B *37/00, 23/04, 23/20, 21/00*
U.S. Cl. 65—2 6 Claims



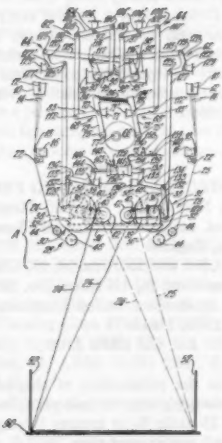
1. A method of producing a one-material optical fiber comprising a light conducting core supported in a protective sleeve by at least one support component, said method comprising the steps of providing a blank having a core and at least one supporting component disposed within a sleeve, heating the blank to a drawing temperature, drawing the blank into a fiber having a drawn core supported in a protective sleeve by a support component integral with both the sleeve and drawn core, and applying a stretching force to the support component in a direction transverse to the axis of the drawn core of the fiber to reduce the thickness of the support component and to reduce the ratio of the thickness of the support component to the thickness of the core of the fiber.

4,046,538

OSCILLATING MECHANISM AND METHOD OF AND MEANS FOR PROMOTING MOTION ACCURACY OF THE MECHANISM IN A FIBER FORMING OPERATION

David Whitfield Thomas, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Apr. 19, 1976, Ser. No. 678,505
Int. Cl.[2] C03B *37/02*
U.S. Cl. 65—4 A 7 Claims



1. The method of distributing a linear group of fibers onto a moving collector including engaging the group of fibers with

a rotating pull wheel, disengaging the group of ffibers from the rotating pull wheel by an oscillating and rotating member associated with the pull wheel, oscillating the member by a cam-actuated linkage system to effect distribution of the group of fibers onto an area of the collector, and applying pressure on the linkage system opposing the operation of the linkage system to substantially eliminate lost motion in the linkage system and thereby promote oscillatory motion accuracy of the fiber disengaging member.

4,046,539

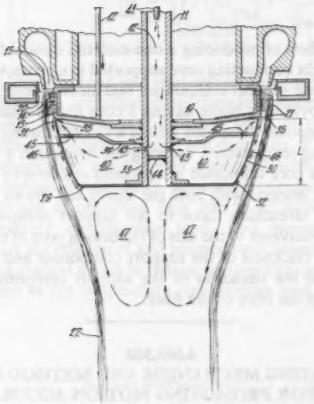
METHOD AND APPARATUS FOR PRODUCING GLASS FIBERS

Richard E. Pitt, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 473,466, May 28, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,433

Int. Cl.² C03B *37/04*

U.S. Cl. 65—6 **12 Claims**



9. In the process of forming fibers by centrifuging molten glass into streams, engaging sid streams by a high molten glass into streams, engaging said streams by a high velocity high temperature annular gaseous blast positioned about the centrifuge periphery thereby attenuating the streams into fine fibers and conveying said fibers axially away from the centrifuge as a cylindrical veil flowing over a coaxial body of revolution immediately downstream of said centrifuge, the method of reducing heat transfer from the high temperature gases within said veil to said body by injecting a continuous flow of gas as mass addition to the boundary layer existing over the surface of said body of revolution.

4,046,540

GLASS INJECTION MOULDING PROCESS

Cyril John Lewis; Neil Carter, and Neil Hunter Ray, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 436,350, Jan. 24, 1974, abandoned. This application June 16, 1975, Ser. No. 586,918

Claims priority, application United Kingdom, Feb. 19, 1973, 7992/73; Apr. 12, 1973, 17615/73

Int. Cl.² C03B *5/00*

U.S. Cl. 65—18 **8 Claims**

1. A process for the production of shaped glass articles which comprises charging a particulate phosphate glass having a P_2O_5 content of 25 mole % or greater having a transformation temperature of not greater than 300° C to an injection moulding machine, converting the glass to the molten state in the barrel of the machine, the barrel temperature being in the range from the temperature at which the glass becomes molten up to a temperature of 600° C injecting the molten glass into a mould on the machine, the temperature of the mould being maintained at a temperature in the range from the transformation temperature to 100° C below the transformation of said glass; and removing the molded article from said mould.

4,046,541

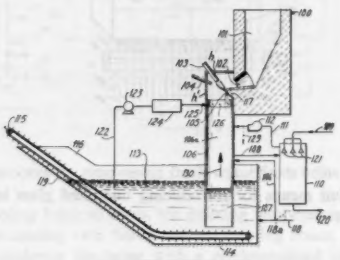
SLAG QUENCHING METHOD FOR PYROLYSIS FURNACES

John Erling Anderson, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,184

Int. Cl.² C03B *37/00*

U.S. Cl. 65—19 **13 Claims**



1. In a process for quenching molten residue discharged from a furnace hearth, through a non-submerged taphole, including the steps of: (a) providing a vertical slag duct communicating in a sealed manner at the top thereof with said taphole, and sealed at the bottom by being immersed a substantial distance into water in a quench tank, (b) flowing the molten residue from the hearth by gravity to and then down the central axis of said slag duct and quenching said residue in the water contained in the submerged portion of said slag duct, said water being at a temperature sufficiently high to prevent slag explosions, the improvement comprising:

substantially reducing cooling of the tap and hearth areas of said furnace by (1) removing sufficient hot fluid from said duct generated by quenching of said molten residue in the water contained in the submerged portion of said duct and (2) replacing said removed hot fluid with cooler water, thereby maintaining the temperature of the water in said duct between about 150° F and the boiling point of the water and substantially preventing steam from entering said tap and hearth areas.

4,046,542

METHOD AND DEVICE FOR GRANULATING BLAST FURNACE SLAG

Kees J. Schmidt, Castricum, Netherlands, assignor to Hoogovens IJmuiden B.V., Ijmuiden, Netherlands

Filed Apr. 1, 1976, Ser. No. 672,619

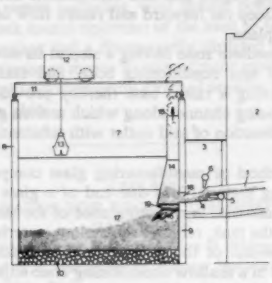
Claims priority, application Netherlands, Apr. 7, 1975, 7504082

Int. Cl.² C03B *5/22*

U.S. Cl. 65—19 **6 Claims**

2. A device for granulating blast furnace slag comprising an open explosion room, a first slag chute which debouches into said open explosion room, a second slag chute positioned lower than said first chute near the delivery point of said first chute, a spraying system, a closed vapour separating box positioned near the end of said second chute, an open granulating pit, into which the second chute debouches and a chimney, said granulating pit comprising a dewatering bed and conveying means for the dewatered granulate, said vapour separating

box comprising an entrance opening into which the second chute debouches, an exit-opening in the bottom, directed



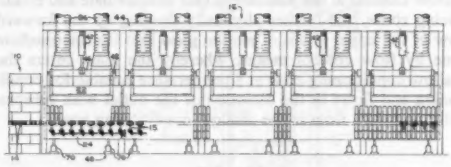
towards the granulating pit, and an opening in the roof which connects to said chimney.

4,046,543

METHOD AND APPARATUS FOR TEMPERING MOVING GLASS SHEETS

George B. Shields, Lower Burrell, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 23, 1976, Ser. No. 679,523
Int. Cl.[2] C03B *27/00*
U.S. Cl. 65—25 A 34 Claims



1. An apparatus adjacent a furnace for tempering hot glass sheets by flowing cool streams of gaseous tempering medium against the opposite surfaces thereof comprising an upper elongated quench bed and a lower elongated quench bed in spaced, generally parallel relation to and facing said upper quench bed, each said quench bed including a series of modules adjacent said furnace, each provided with a flat glass sheet facing surface having a plurality of slots therethrough, each slot having an approximately uniform width of between about 1,100 inch (0.25 millimeter) and about 1/32 inch (0.8 millimeter) for applying thin streams of gaseous tempering medium against the surface of a succession of glass sheets conveyed longitudinally of said bed past said modules, said modules being spaced apart to provide therebetween longitudinally spaced exhaust passages extending transversly of said bed continuously across the entire width of said conveyed glass sheets, said elongated quench beds extending from an upstream end adjacent an exit of a furnace for heating said glass sheets to a temperature suitable for tempering and a downstream end spaced from said exit, the total area of said exhaust passages occupying at least about 20 percent of the area of said quench bed and the total area of said stream applying slots not exceeding about 6 percent of said quench bed area, and means to provide cool gaseous tempering medium at a rate sufficient to cause said gaseous tempering medium to flow through said slots at a rate sufficient to cool said glass sheets rapidly enough to temper said sheets and to be exhausted through said exhaust passages, wherein said elongated slots extend parallel to one another diagonally of the glass sheet facing surfaces of said modules disposed adjacent said furnace exit, and wherein adjacent elongated slots of each said module overlap one another along the length of said elongated bed, and said slots are directed diagonally through the thickness of said modules.

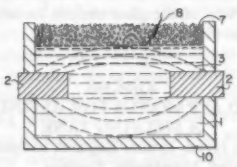
31. A method of tempering glass sheets to provide said sheets with a high temper and little surface distortion comprising heating each glass sheet in a series thereof to a temperature sufficient for tempering while conveying said sheets through a hot atmosphere, and cooling the opposite major surfaces of each of said heated sheets by passing each of said heated sheets between a pair of sets of streams of cool gaseous tempering medium, first directed at relatively large oblique angles relative to planes normal to the major surfaces of said sheets when the latter pass through a first region immediately downstream of said hot atmosphere, then to streams of cool gaseous tempering medium directed at relatively small oblique angles relative to said planes when said sheets pass through a second region downstream of said first region, and then subjecting said glass sheets to additional streams of cool gaseous tempering medium directed normal to the major surfaces of said sheets when the latter pass through a third region downstream of said second region.

4,046,544

ALKALINE GLASS MELTING WITH POROUS COVER

John Haines Wills, Box 37, Cheyney, Pa. 19319

Continuation-in-part of Ser. No. 331,963, Feb. 12, 1973, abandoned. This application Dec. 17, 1975, Ser. No. 641,400
Int. Cl.[2] C03B *5/16, 3/00, 32/32*
U.S. Cl. 65—27 3 Claims



1. In a process of melting soluble silicate glass in an electric resistance furnace, said soluble silicate glass having a ratio of below about 2.8 SiO_2/Na_2O wherein there is a tendency of the batch to produce escaping gas during sintering while the said batch is used as a heat insulating blanket over the melted glass, the improvement comprising forming the raw batch materials consisting essentially of silica, sodium oxide and an alkali metal alt which is decomposable by heat to a melt component and a gaseous component wherein the ratio of SiO_2 to Na_2O is below about 2.8, with a solution taken from the group consisting of water and dilute alkaline solutions, into particles having a mean diameter of about 0.04 cm and applying the formed particles over the melt as a porous blanket in the said electric resistance furnace to permit the escaping gases to pass through said cover during the melting process whereby volcano-like eruptions are avoided.

4,046,545

METHOD FOR MAKING MOLDED GLASS ARTICLES HAVING BULK HOMOGENEITY AND OPTICAL QUALITY SURFACE

Leon M. Sanford, and Che-Kuang Wu, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 25, 1976, Ser. No. 689,791
Int. Cl.[2] C03B *23/00;* C03C *3/04*
U.S. Cl. 65—30 R 8 Claims

1. A method of preparing an optical glass article comprising the steps of

A. preparing a base anhydrous glass comprising in mole percent, on an oxide basis, 70 to 82% SiO_2, 10 to 17% Na_2O and/or K_2O, and 5 to 15% of an oxide or oxides selected from ZnO and PbO;

B. hydrating the base glass;

C. partially dehydrating the glass to a water content ranging from about 3 to 8 weight percent at a temperature above the softening point of the glass and, using an inert gas, at a total pressure above the vapor pressure of the water within the glass; and

D. preforming a sample of the glass of step (C) and then molding the preformed sample of the partially dehydrated glass against a die having a desired optical quality surface

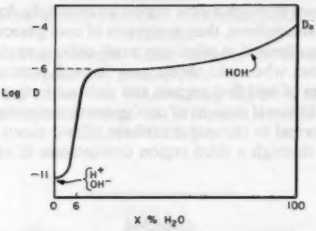


figure under conditions sufficient to impart to a surface of the glass the surface figure of the die, the molding being done under conditions sufficient to maintain the water content in the glass, to assure that at least one portion of the glass is capable of transmitting an amount of light about equal to the maximum amount theoretically possible, and to maintain or result in an optical quality surface on that portion of the glass surface to which the surface figure of the die is transferred.

4,046,546

METHOD AND APPARATUS FOR REFINING GLASS IN A MELTING TANK

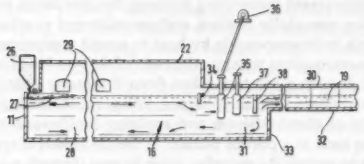
William Christie Hynd, Lymm, England, assignor to Pilkington Brothers Limited, Merseyside, England

Filed Jan. 30, 1976, Ser. No. 653,827

Claims priority, application United Kingdom, Jan. 31, 1975, 4360/75

Int. Cl.[2] C03B 5/22

U.S. Cl. 65—135 23 Claims



1. A glass melting apparatus comprising:

an elongated tank body for containing molten glass and having an inlet end for receiving glass forming material and an outlet end for glass leaving said tank body for use in a forming process, said tank body defining:

a. a melting region adjacent said inlet end for melting the glass forming material,

b. a refining region downstream of said melting region for refining the molten glass,

c. a conditioning zone adjacent said outlet end for conditioning the refined glass, and

d. an intermediate zone leading from said refining region to said conditioning zone;

said intermediate zone and said conditioning zone being substantially narrow relative to said refining region;

flow control means for physically slowing up the forward flow of the upper levels of glass out of said refining region and into said narrower intermediate and conditioning zones;

said refining region and said intermediate zone being sufficiently deep for forward and return flow of molten glass to take place;

said intermediate zone having a step at its downstream end adjacent said conditioning zone, and said conditioning zone having a raised base thereby providing a shallow conditioning channel along which molten glass may flow in the direction of said outlet with substantially no return flow.

17. A method of manufacturing glass comprising feeding glass forming material into one end of a glass melting tank, melting the material in a melting zone of the tank adjacent an inlet end of the tank, refining the molten material at a refining zone downstream of the melting zone, and conditioning the molten glass in a shallow conditioning zone adjacent an outlet end of the tank so that the molten glass leaves the tank ready for use in a forming process, said method further comprising passing the molten glass from an inlet end of a glass melting tank through a wide body portion including said refining zone and subsequently through a substantially narrower channel, including said shallow conditioning zone and a deeper intermediate zone leading from said refining zone to said conditioning zone, towards the outlet end, said refining zone and said intermediate zone being sufficiently deep for forward and return flow of molten glass to take place, enforcing temperature gradients within the melting, refining and intermediate zones and enforcing forward and return flows of molten glass in the melting. refining and intermediate zones, limiting the downstream position of the return flow at a step in the base of the narrow channel at the juncture of said intermediate and conditioning zones, and further physically slowing up the forward flow of the upper levels of molten glass into the intermediate zone by flow control means, whereby the glass enters the shallow conditioning zone at a temperature suitable for conditioning and flows in the direction of the outlet with substantially no return flow in the shallow conditioning zone.

4,046,547

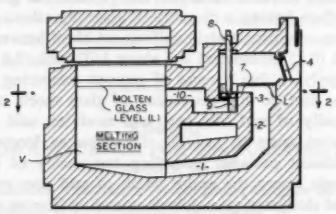
GLASS MELTING FURNACE AND PROCESS FOR IMPROVING THE QUALITY OF GLASS

Helmut Pieper, Lohr, Germany, assignor to Sorg GmbH & Co. KG, Plochsbach, Germany

Filed June 10, 1976, Ser. No. 694,863

Int. Cl.[2] C03B 5/26

U.S. Cl. 65—135 9 Claims



1. In a method for operating a glass melting furnace having a melting zone and one or more processing zones disposed adjacent to said melting zone wherein a portion of the molten glass flowing from said melting zone to said processing zone is recirculated to said melting zone, the improvement which comprises recirculating said molten glass from said processing zone by withdrawing molten glass to be recirculated laterally in a surface flow from said processing zone and thereafter causing the withdrawn molten glass to flow downwardly while applying a submerged, downwardly directed impulse thereto.

5. In a glass melting furnace having melting means and at least one processing tank means communicating with said melting means through passage means and recirculating pas-

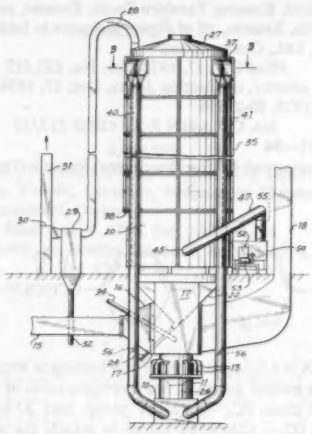
sage means between said processing tank means and said melting means, the improvement which comprises means for establishing a recirculating flow of molten glass via said recirculating passage means including weir means positioned in said processing tank means upstream of the inlet to said recirculating passage means and a downwardly directed portion in the recirculating passage means having agitator means submerged therein to apply a downwardly directed impulse to the recirculating molten glass.

4,046,548

APPARATUS FOR PRODUCING SPHERICAL PARTICLES

Thomas K. Wood, Essex Fells, and Alan R. Margreither, Wyckoff, both of N.J., assignors to Potters Industries, Inc., Hasbrouck Heights, N.J.

Filed Apr. 28, 1976, Ser. No. 681,189
Int. Cl.² C03B *19/10*
U.S. Cl. 65—142 **19 Claims**



1. Apparatus for producing spherical particles comprising, in combination:

a vertical draft tube having an infeed opening adjacent its lower end;

heat source means disposed within said draft tube intermediate its ends

an expansion chamber communicating with and extending above said draft tube, said heat source means maintaining the interior of the expansion chamber at an elevated temperature;

means for introducing particles of sphere forming material into said draft tube above said heat source means, the introduced particles being carried upwardly into the expansion chamber by the heat from said heat source means and being shaped by surface tension into spherical form;

enclosure means disposed about the expansion chamber in spaced relationship therewith, the enclosure means having at least one infeed opening therein;

means for introducing combustion supporting gas into the infeed opening of the enclosure means, the gas introduced through said infeed opening flowing into the space between the enclosure means and the expansion chamber and being raised to an elevated temperature by the heat from said heat source means; and

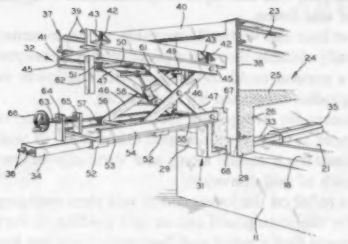
means for withdrawing the heated gas from the space between the enclosure means and the expansion chamber and for feeding the withdrawn gas to the infeed opening of said draft tube.

4,046,549

RETRACTABLE SUPPORT FOR FLOAT GLASS APPARATUS

James W. Miller, Rossford, and Frederick D. Zarecky, Holland, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed May 21, 1976, Ser. No. 688,687
Int. Cl.² C03B *18/02*
U.S. Cl. 65—182 R **8 Claims**



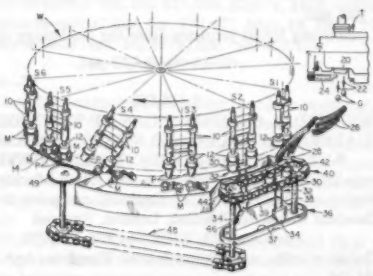
1. In apparatus for producing float glass including an elongated tank containing a bath of molten metal upon which the glass is floated in ribbon form, an enclosed chamber over said tank including a roof structure spanning opposite side walls, said opposite side walls being spaced above corresponding walls of said tank to define an access opening therebetween, and regulating means extending through said access opening into said enclosed chamber, the improvement comprising a retractable carrier suspending said regulating means entirely from above whereby said regulating means can be vertically raised while retaining its original attitude from a lowered operative position along said tank to an elevated storage position permitting unhindered access therebeneath to said chamber, and means defining an opening in the side wall communicating with the corresponding access opening and extending upwardly toward said roof structure for receiving said regulating means as it is raised to said elevated storage position.

4,046,550

GLASS CONTAINER MAKING MACHINE

George A. Thyoux, Soignies, Belgium, assignor to Durobor S.A., Soignies, Belgium

Filed June 18, 1975, Ser. No. 587,993
Claims priority, application Belgium, June 20, 1974, 145655
Int. Cl.² C03B *9/00*
U.S. Cl. 65—229 **4 Claims**



1. In a glass container forming machine comprising:

A. a circular horizontal frame rotatable about a vertical axis,

B. a plurality of vertically movable blowing spindles spaced at equal angular distances around the periphery of said frame, and

C. parison rim clamping means on each of said spindles, the improvement comprising:

D. a peripheral ring gear on said frame,

E. an endless parison mold conveyor of sprocket chain links having two substantially parallel oppositely moving reaches in the same horizontal plane, one reach adjacent the periphery of said frame and the other reach spaced outwardly therefrom,

F. gearing means driven by said ring gear for continuously moving said conveyor in synchronism with the periphery of said frame,

G. at least one vertically movable carrier mounted on a stem vertically slidable through a pivot of said conveyor chain link

H. a parison mold cooperable with the lower ends of said spindles supported by said carrier,

I. means for dropping a molten glass gob into said parison mold as it moves along said other reach of said conveyor,

J. cam track means along and vertically below the entire path of said conveyor,

K. a roller on the lower end of said stem engaging said track for supporting said carrier and guiding its vertical movements first toward and then away from the lower ends of said spindles when said mold moves along said one reach of said conveyor, and

L. plunger means on said spindles for vertical downward movement for forming a parison from said glob in said mold and attaching said parison to said clamping means while said mold moves along said other reach of said conveyor, whereby said parison is transferred from said mold to a spindle.

4,046,551

ORGANIC DIGESTER APPARATUS AND METHOD

Jay Anderson, P.O. Box 585, Elkhart, Ind. 46514

Filed July 11, 1975, Ser. No. 595,176

Int. Cl.[2] C05F *11/08*

U.S. Cl. 71—10 **16 Claims**

1. A method of anaerobically digesting organic material for the producing of fertilizer and methane gas, which comprises:

a. depositing a quantity of organic material into a collecting digester;

b. transferring the organic material from the collecting digester into a first stage digester that is substantially devoid of organic material, that is sealed against the entry of air, and that is filled with anaerobically generated methane gas;

c. transferring the organic material from the first stage digester to a final stage digester that is substantially devoid of organic material, that is sealed against the entry of air, and that is filled with anaerobically generated methane gas; and

d. removing liquid fertilizer from the final stage digester.

4,046,552

HERBICIDAL COMPOSITIONS OF BIPYRIDYLIUM QUATERNARY SALTS AND EMETIC AMOUNTS OF S-TRIAZOLO PYRIMIDINE DERIVATIVES

George Edward Davies, Wilmslow, and David Mackie Foulkes, Henley-on-Thames, both of England, assignors to Imperial Chemical Industries Limited, London, England

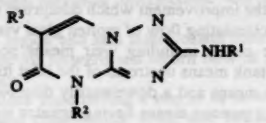
Filed Aug. 23, 1976, Ser. No. 716,801

Claims priority, application United Kingdom, Apr. 15, 1976, 15584/76

Int. Cl.[2] A01N *9/22*

U.S. Cl. 71—92 **14 Claims**

1. A herbicidal composition of reduced health hazard comprising a herbicidally effective salt of a herbicidal bipyridylium quaternary cation and an effectively emetic amount of a s-triazolo pyrimidine derivative of the formula:



wherein R^1 is hydrogen, a C_{1-4} alkyl radical, or a COOEt radical; R^2 is a C_{1-4} alkyl radical or an allyl radical, and R^3 is a C_{1-4} alkyl radical, or a pharmaceutically acceptable emetically active addition salt thereof.

4,046,553

HERBICIDAL COMPOUND, HERBICIDAL COMPOSITION CONTAINING THE SAME AND METHOD OF USE THEREOF

Ryohei Takahashi, Kusatsu; Kanichi Fujikawa, Kyoto; Isao Yokomichi, Kusatsu; Yasuhiro Tsujii, Kusatsu, and Nobuyuki Sakashita, Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha, Ltd., Osaka, Japan

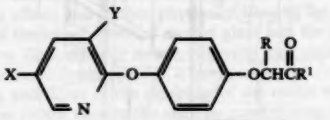
Filed Oct. 17, 1975, Ser. No. 623,517

Claims priority, application Japan, Oct. 17, 1974, 49-118676; Mar. 13, 1975, 50-29556

Int. Cl.[2] A01N *9/32*; C07D *213/30*

U.S. Cl. 71—94 **28 Claims**

1. A compound having the general formula (I):



(I)

wherein X is a halogen atom; Y is a hydrogen atom, a halogen atom or a methyl group; R is a hydrogen atom or a straight or branched chain (C_1 – C_6)alkyl group; and R^1 is a hydroxy group; a (C_1 – C_9)alkoxy group in which the alkyl moiety thereof may be straight or branched chain and may be substituted with one or more of a halogen atom or a hydroxy group; a (C_2 – C_4)alkenyloxy group; a cyclohexyloxy group in which the cyclohexyl moiety thereof may be substituted with one or more of a halogen atom or a methyl group; a phenoxy group in which the aryl moiety thereof may be substituted with one or more of a halogen atom or a methyl group; a benzyloxy group in which the aryl moiety thereof may be substituted with one or more of a halogen atom an —OM group where M is a cation;

10. The herbicidal composition of claim 9, wherein R^1 is a hydroxy group, a (C_1–C_9) alkoxy group in which the alkyl moiety thereof may be straight or branched chain, or an —OM group where M is a cation.

4,046,554

DIALKYL ACETALS OF ANILINOACETALDEHYDES

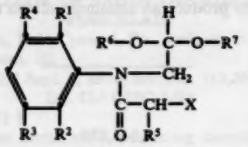
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 530,797, Dec. 19, 1974, Pat. No. 3,966,811. This application Apr. 23, 1976, Ser. No. 679,628

Int. Cl.[2] A01N *9/20*

U.S. Cl. 71—118 **9 Claims**

1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



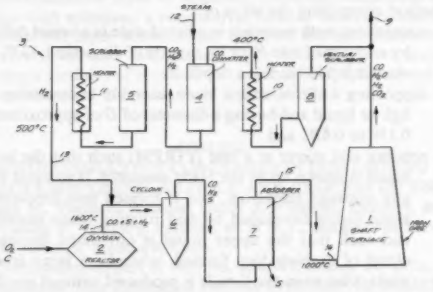
wherein R^1, R^6 and R^7 are each lower alkyl; R^2 is selected from the group consisting of hydrogen, lower alkyl, and lower alkoxy; R^3 and R^4 are each selected from the group consisting of hydrogen, lower alkyl, halogen, cyano, lower alkoxy, lower alkylthio, lower chloroalkyl, trifluoromethyl and lower alkoxyalkyl; R^5 is selected from the group consisting of hydrogen and lower alkyl; and X is selected from the group consisting of chlorine and bromine.

4,046,555

METHOD OF DIRECT REDUCTION OF IRON ORE

Georg Lange, Voerde, Germany, assignor to Thyssen Purofe GmbH, Dusseldorf, Germany

Filed Aug. 8, 1975, Ser. No. 603,196
Claims priority, application Germany, Aug. 13, 1974, 2438790
Int. Cl.² C21B *13/02*
U.S. Cl. 75—35 **2 Claims**



1. In the reduction of iron ore wherein the ore is subjected to a reducing gas and a stack gas is produced, the improvement comprising the steps of:

a. reacting coal and oxygen to make a producer gas of carbon monoxide and hydrogen in a volume ratio of at least 1.5:1 **and sulfur and at a temperature of about** 1600° C;

b. treating said stack gas with steam to convert said stack gas into a converter-gas mixture of carbon dioxide and hydrogen;

c. scrubbing said carbon dioxide out of the converter-gas mixture of step (b) to form a hydrogen-containing gas;

d. heating said hydrogen-containing gas to a temperature of about 400° C;

e. adding the producer gas of step (a) to the hydrogen-containing gas of step (d) to form a reducing gas having a volume ratio of carbon monoxide to hydrogen of at most 1:1

f. stripping sulfur from the gas produced in step (e);

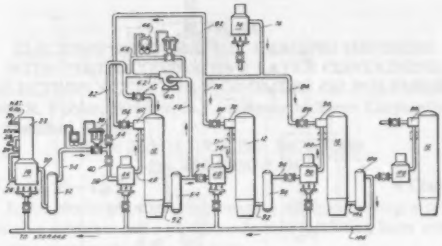
g. reducing the iron ore with the reduction gas of step (f).

4,046,556

DIRECT GASEOUS REDUCTION OF OXIDIC METAL ORES WITH DUAL TEMPERATURE COOLING OF THE REDUCED PRODUCT

Juan Celada, and Patrick W. MacKay, both of Monterrey, Mexico, assignors to Fierro Esponja, S.A., Monterrey, Mexico

Filed Jan. 2, 1976, Ser. No. 646,379
Int. Cl.² C21B *13/02*
U.S. Cl. 75—35 **11 Claims**



1. In a process for the batchwise reduction of a metal oxide to sponge metal by contact with a hot reducing gas in a multiple unit reactor system of the type in which separate fixed beds of metal-bearing material are simultaneously treated in a plurality of reactors including at least one cooling reactor and at least one reduction reactor and a cool carbon-containing reducing gas is passed through a cooling reactor of said system, heated to a temperature of 950° to 1100° C. and then passed through a reduction reactor of said system, the method of cooling and carburizing a bed of metal-bearing material in said cooling reactor which comprises pre-heating a stream of said cool reducing gas to a temperature of 250° to 800° C. before it comes in contact with said metal bearing material, passing said preheated stream of reducing gas through said bed of metal-bearing material in said cooling reactor for a first period of time to carburize the metal thereof and reduce metal oxide present therein and thereafter passing a stream of said cool but not pre-heated reducing gas through said bed of metal-bearing material in said cooling reactor for a second period of time to complete the cooling of said material.

4,046,557

METHOD FOR PRODUCING METALLIC IRON PARTICLES

Donald Beggs, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Continuation-in-part of Ser. No. 611,099, Sept. 8, 1975, which is a continuation-in-part of Ser. No. 578,477, May 19, 1975. This application Nov. 14, 1975, Ser. No. 632,137
Int. Cl.² C21B *13/02*
U.S. Cl. 75—35 **13 Claims**

1. A method for producing a metallized product comprising:

a. establishing a gravitational flow of particulate metal oxide material by charging the particulate metal oxide material to the upper portion of a generally vertical furnace having an upper reducing zone and a lower cooling zone, and removing the metallized product from the bottom of the furnace;

b. introducing a reducing gas to the gravitational flow of material at a temperature sufficient to promote a reducing reaction between said reducing gas and said material at a first inlet intermediate the ends of the furnace;

c. causing said reducing gas to move countercurrent through the gravitational flow of material, react with and reduce a substantial portion of the metal oxide and form a top gas;

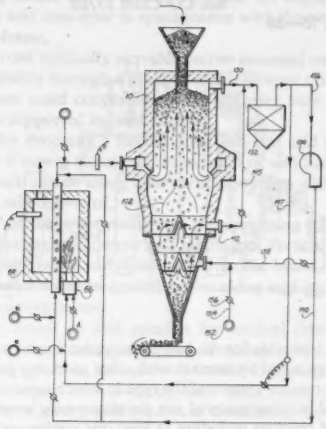
d. removing said top gas from the upper portion of the furnace;

e. cooling said top gas;

f. introducing a portion of said cooled top gas as cooling gas into a second inlet near the lower end of said furnace;

g. removing a first portion of said cooling gas from said furnace at a location intermediate said first and second inlets;

h. adding said removed portion of said cooling gas to said top gas prior to step (e); and



i. causing a second portion of said cooling gas to flow upwardly through the gravitational flow of material, become heated thereby, and act as a reducing gas in the reducing zone;

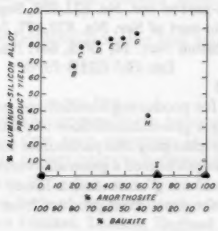
whereby that portion of said cooling gas flowing upwardly through the gravitational flow of material has a greater reducing potential than the spent top gas, and is thus an effective reductant.

4,046,558

METHOD FOR THE PRODUCTION OF ALUMINUM-SILICON ALLOYS

Subodh K. Das, Natrona Heights, and Richard A. Milito, Natrona, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 22, 1976, Ser. No. 744,154
Int. Cl.² C22B *21/02*
U.S. Cl. 75—68 A **14 Claims**



1. A method of carbothermically reducing alumina and silica bearing materials to produce aluminum-silicon alloys comprising:

a. providing alumina and silica bearing materials in a mix having a weight ratio of silica to alumina in the range of 0.5 to 1.1;

b. providing in said mix a source of carbonaceous material for effecting reduction of said alumina and silica in said mix; and

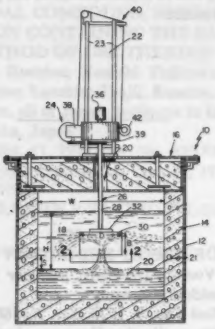
c. carbothermically reducing alumina and silica contents of said mix to produce an aluminum-silicon alloy.

4,046,559

PYROMETALLURGICAL SYSTEM FOR LIQUID-LIQUID CONTACTING

Peter B. Crimes, Sudbury, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,020
Int. Cl.² C22C *9/00*; B01F *9/10*
U.S. Cl. 75—93 R **29 Claims**



1. The method of promoting a reaction between a first denser material and a second lighter material, the materials having specific gravities differing by at least about 0.5, the method comprising the steps of

maintaining both materials in a liquid state in a vessel defined by a square of side *W* or by a circle of diameter 1.13*W*, the second liquid having a depth *H*,

supporting a stirrer with a blade assembly immersed in the lighter liquid and having a diameter of *D* of approximately 0.1*W* to 0.4*W*, and

rotating said stirrer at a rate *N* (RPM) such that the lower liquid is drawn up to the blade assembly, is pumped radially outward therefrom, and is formed into droplets by shear forces developed by said rotating blade assembly, and such that the upper liquid is circulated through a cloud of droplets thus formed, whereby a large area of contact between the liquids is produced without emulsification.

4,046,560

NICKEL BASE ALLOY

John C. Freche, Fairview Park, and William J. Waters, Cleveland, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,507
Int. Cl.² C22C *19/03*
U.S. Cl. 75—170 **5 Claims**

1. A nickel-base alloy adapted for use at elevated temperatures between about 2000° F and about 2200° F consisting essentially of from 15–17 percent tungsten, from 6.8–7.2 percent aluminum, from 0.8–1.8 percent molybdenum, from 1.8–2.2 percent columbium, from 0.2–0.4 percent zirconium, from 0.15–0.20 percent carbon, and the balance nickel.

4,046,561
DENTAL ALLOY OF USE IN THE ADHESION OF PORCELAIN

Emil M. Prosen, Bala-Cynwyd, Pa., assignor to Neoloy Products, Inc., Posen, Ill.

Filed Sept. 1, 1976, Ser. No. 719,367
Int. Cl.² C22C 5/04
U.S. Cl. 75—172 R 5 Claims

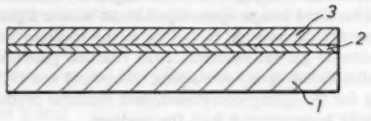
1. A precious metal alloy consisting essentially of, from 1-3% of boron, and a small percentage up to 31% of molybdenum and the balance palladium.

3. A precious metal alloy according to claim 1 adapted to have porcelain and like ceramics fused thereto which alloy contains a metal selected from the group consisting of nickel and a gallium in an amount of 5% or less.

4,046,562
ELECTROPHOTOGRAPHIC RECORDING MATERIAL AND ITS METHOD OF MANUFACTURE

Wolf Glowinski, Warstein; Hartmut Dülken, Belecke; Gottfried Guder, Belecke, and Karl-Heinz Kassel, Belecke, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Dec. 19, 1974, Ser. No. 534,220
Claims priority, application Germany, Dec. 21, 1973, 2363738
Int. Cl.² G03G 5/04; C25D 5/00
U.S. Cl. 96—1.5 R 14 Claims



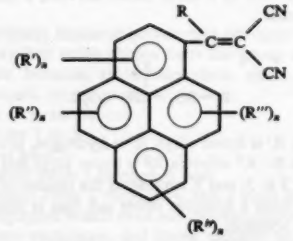
1. Electrophotographic recording material comprising a photoconductive layer of selenium, selenium compounds or alloys with selenium, a conductive, flexible substrate, and an intermediate layer between said substrate and said photoconductive layer, said intermediate layer consisting of a metal having a modulus of elasticity of less than 6000 kp/mm² and a recrystallization temperature of less than 40° C.

4,046,563
PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYRENE, ARTICLE AND PROCESS OF USE

James M. Pearson, Webster; David J. Williams, Fairport, and William W. Limburg, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 454,487, March 25, 1974, abandoned. This application Feb. 10, 1975, Ser. No. 548,452
Int. Cl.² G03G 5/04
U.S. Cl. 96—1.5 R 12 Claims

1. A photoconductive composition comprising a solid solution of at least one photogenerator compound of the formula



wherein

R is — H or —CN;

R', R'', R''' and R'' are independently selected from an aliphatic hydrocarbon radical having from about 1 - 10 carbon atoms; phenyl; or substituted phenyl wherein said substituents are capable of releasing electrons to relatively electron deficient centers within the compound; amino; diarylamino; dialkylamino or alkoxy; *n* can range from 0 up to the potential number of positions of substitution on the aromatic ring system

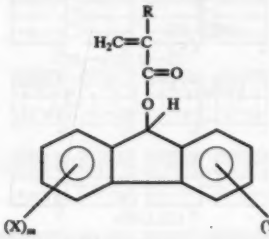
and an insulating polymeric matrix, said polymeric matrix being capable of rapid and efficient transport charge carriers of at least one polarity.

4,046,564
ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR MONOMERS OR POLYMERS

Sam R. Turner, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed July 16, 1975, Ser. No. 596,689
Int. Cl.² G03G 5/04
U.S. Cl. 96—1.5 R 4 Claims

1. An electrophotographic imaging member having a conductive substrate and a photoconductive insulating layer comprising monomers of the formula



wherein

R is hydrogen or methyl;

X and Y are independently selected from the group consisting of NO_2, halogen, —CN and $—CF_3$; and

m and *n* can range from 0 to 3.

4,046,565
AMORPHOUS SELENIUM COATING

Norman Carlile Miller, Shaker Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Mar. 25, 1975, Ser. No. 561,702
Int. Cl.² G03G 5/04
U.S. Cl. 96—1.5 R 11 Claims

1. A process for depositing a layer of photoconductive amorphous selenium upon a substrate which comprises evaporating amorphous selenium at a temperature in the range of about from 170° to 250° C at a pressure in the range of about from 1×10^{-4} torr to 6×10^{-2} torr, introducing an inert gas into an evacuated system having a pressure in the range of about from 1×10^{-7} torr to 1×10^{-6} torr, thus scattering said amorphous selenium and condensing amorphous selenium upon the entire surface of said substrate, the charge acceptance of the resulting selenium layer being in the range of about from 1/5 to ½ of the dielectric breakdown voltage.

10. A photoconductive selenium coated substrate produced by a process which comprises evaporating amorphous selenium at a temperature in the range of about from 170° to 250° C at a pressure in the range of about from 1×10^{-4} torr to 6×10^{-2} torr, introducing an inert gas into an evacuated system having a pressure in the range of about from 1×10^{-7} torr to 1×10^{-6} torr, thus scattering said amorphous selenium and condensing amorphous selenium upon the entire surface of said substrate, the charge acceptance of the resulting selenium layer

being in the range of about from 1/5 to 1/3 of the dielectric breakdown voltage.

4,046,566

PROCESS FOR THE PRODUCTION OF MASKED POSITIVE COLOR IMAGES BY THE SILVER DYE BLEACH PROCESS USING SILVER COMPLEX DIFFUSION

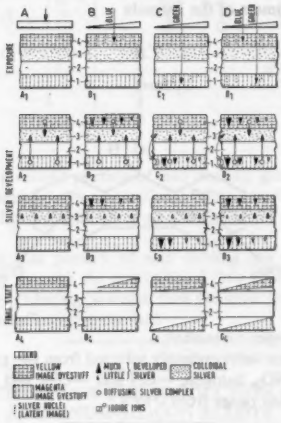
Max Marthaler, Marly, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed Oct. 23, 1975, Ser. No. 625,235

Claims priority, application Switzerland, Oct. 28, 1974, 14401/74

Int. Cl.² G03C 7/04, 1/76, 3/00

U.S. Cl. 96—7 **14 Claims**



1. Process for the production of masked subtractive positive colour images in accordance with the silver dye bleach process, by exposure, silver development, dye bleaching, silver bleaching and fixing, using a photographic material which contains, in each of at least two layers, a dyestuff which can be bleached imagewise, and of which the absorption maximum corresponds to one of the primary colours red, green and blue, with a silver halide emulsion layer sensitive to a particular spectral region being allocated to each dyestuff, which process comprises employing a photographic material in which

a. a silver halide emulsion layer consisting at least partially of silver iodide is allocated to the dyestuff, of which the undesired parasitic colour density is to be compensated,

b. in a further layer, at least one second dyestuff, of which the main colour density corresponds to a parasitic colour density, requiring compensation, of the first dyestuff, and a silver halide emulsion free from iodide ions, are present,

c. a further layer, which is adjacent to that containing the second dyestuff, contains colloidal nuclei which are capable of depositing metallic silver from soluble silver complexes,

d. a separating layer is present between the layer containing the nuclei and the dyestuff layer, of which the parasitic colour density is to be compensated,

and which process also comprises employing a silver devolper bath containing a ligand, which is able to produce water-soluble silver complexes which are capable of diffusion.

4,046,567

CHRISTIANSEN CELLS CONTAINING EPOXY GELLING AGENTS

Donald George Pye, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 2, 1976, Ser. No. 710,614

Int. Cl.² G03G 5/04

U.S. Cl. 96—27 R **22 Claims**

1. In a Christiansen cell having as its operating element two constituents differing in optical dispersion but having identical refractive indices at a matching wavelength in or near the region of the visible spectrum, the constituents being a disperse phase dispersed in an optically homogeneous light sensitive medium whose refractive index is locally changed upon exposure to actinic light, the improvement wherein the medium contains the reaction product from (1) a multifunctional epoxy-containing compound and (2) a curing agent for the epoxy compound, said reaction product being optically homogeneous with the medium.

12. In a method of forming a colored image by projection of light through a Christiansen cell so that the light is separated into scattered and unscattered components either of which is focused on a viewing surface, said Christiansen cell having two constituents of different optical dispersion but having identical refractive indices at a matching wavelength in or near the visible spectrum, the constituents being a disperse phase dispersed in an optically homogeneous light sensitive medium whose refractive index is locally changed in accordance with a predetermined image upon exposure to actinic light, the improvement comprising: including in the medium an amount effective to gel the medium of the reaction product of (1) a multifunctional epoxy-containing compound and (2) a curing agent for the epoxy compound, said reaction product being optically homogeneous with the medium.

4,046,568

DISULFONYL SILVER HALIDE SOLVENTS SUBSTITUTED WITH PIPERAZINE AT ONE SULFONYL GROUP

Richard B. Greenwald, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 564,167, April 1, 1975, abandoned. This application July 19, 1976, Ser. No. 706,462

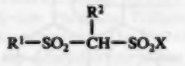
Int. Cl.² G03C 5/54, 5/38, 1/48, 1/40

U.S. Cl. 96—29 R **49 Claims**

24. A diffusion transfer photographic process comprising the steps of:

1. reacting exposed silver halide of an imagewise exposed photosensitive silver halide emulsion layer carried on a support with a silver halide developing agent in aqueous alkaline solution;

2. reacting unreduced silver halide of said photosensitive emulsion with as a silver halide solvent, a compound of the formula



wherein R^1 is lower alkyl, R^2 is hydrogen, lower alkyl or $-(CH_2)_m-S-R^0$ wherein R^0 is lower alkyl and m is a whole number 2 to 5; and X represents the residue of a 1-piperazine to form a complex silver salt that is soluble in said alkaline solution;

3. transferring said complex silver salt to a superposed image-receiving layer; and

4. reducing said transferred complex silver salt to provide a silver image.

4,046,569
PHYSICAL DEVELOPMENT OF PD(II) PHOTOSENSITIVE COMPLEXES WITH A LEUCOPHTHALOCYANINE DYE AND A REDUCING AGENT THEREFOR

Henry J. Gysling, and Mark Lelental, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,668
Int. Cl.² G03C 5/24, 1/48, 1/40
U.S. Cl. 96—48 PD **32 Claims**

1. A process of preparing phthalocyanine dye image comprising imagewise forming palladium nuclei and catalytically reducing a leucophthalocyanine dye in contact with said palladium nuclei, with a reducing agent that does not spontaneously reduce the leucophthalocyanine dye.

3. A process of preparing a phthalocyanine dye image comprising forming a latent image of palladium nuclei by imagewise exposing to electromagnetic radiation one or more palladium complexes chosen from the group represented by the general formula:

$$[Pd(G)_a(J)_b(K)_c(N)_d]_eM_f$$

ps wherein

G, J, K and N are ligands selected from the group consisting of halogen ligands, carboxylic acid ligands, aromatic ligands, nitrogen ligands, phosphorous ligands and arsenic ligands;

M is selected from the group consisting of ions selected from the group consisting of hydrogen ions, inorganic acid ions, organic acid ions, and metal ions selected from the group consisting of sodium ions, potassium ions, calcium ions, strontium ions and aluminum ions and onium ions;

$a + b + c + d$ is an integer from 1 through 4;

e is 1 or 2; and

f is an integer from 0 through 8, and catalytically reducing a leucophthalocyanine dye in contact with said palladium nuclei, with a reducing agent which does not spontaneously reduce said leucophthalocyanine dye or said palladium complexes.

12. A photographic element comprising a photosensitive layer comprising one or more palladium complexes said complexes being capable of forming palladium nuclei on exposure to electromagnetic radiation, a layer comprising a leucophthalocyanine dye and a layer containing a reducing agent which does not spontaneously reduce said leucophthalocyanine dye or said palladium complexes and being capable of reducing said leucophthalocyanine dye to phthalocyanine dye in the presence of said palladium nuclei, said layers being in reactive association with one another.

28. A photographic element comprising a photosensitive layer comprising one or more palladium complexes capable of forming palladium nuclei on exposure to electromagnetic radiation, said; palladium complexes are chosen from the group represented by the general formula:

$$[Pd(L)_g(X)_h]_iY_j$$

wherein;

L is a sterically hindered polydentate nitrogen ligand,

X is a univalent anion chosen from the group consisting of chloride, bromide, azide, thiocyante, selenocyanate, tellurocyanate, nitrate, acetate;

Y is X or a tetraarylborate;

i g and h are 1 or 2;

$g + h$ is at least 2;

i is an integer from 1 through 4; and

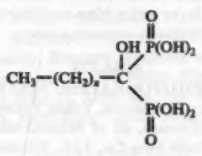
j is an integer from 1 through 4; and a layer comprising a reducing agent which does not spontaneously reduce said palladium complexes and being capable of reducing a leucophthalocyanine dye to phthalocyanine dye in contact with said palladium nuclei, said reducing agent is chosen from the group consisting of amine boranes, phosphine boranes, arsine boranes, phosphite boranes, stibine boranes, boronium salts and cyanoborohydride ion, said layers being in reactive association with one another.

4,046,570
HARDENING FIXER FOR PHOTOGRAPHIC SILVER HALIDE MATERIAL

Marcel Robert Fierens, Duffel, and Renaat Frans Heylen, Deurne, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed May 27, 1976, Ser. No. 690,585
Claims priority, application United Kingdom, June 13, 1975, 25405/75
Int. Cl.² C03C 5/38
U.S. Cl. 96—61 R **6 Claims**

6. In a method of processing an imagewise exposed photographic silver halide element comprising the steps of developing by means of a developer comprising a silver halide developing agent and treating the developed element with a hardening fixer comprising an aluminum hardener and a thiocyanate or thiosulphate silver halide solvent, the improvement which comprises using in the fixer composition a 1-hydroxy-alkylidene diphosphonic acid of the formula:



n being 0, 1, 2, or 3.

4,046,571
PROCESSING SOLUTION FOR USE AS PHOTOGRAPHIC DEVELOPER BATH AND REPLENISHER THEREFOR

John R. Mertz, Conklin, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed June 27, 1975, Ser. No. 591,093
Int. Cl.² G03C 5/26, 5/30
U.S. Cl. 96—66 HD **8 Claims**

1. An aqueous photographic processing solution useful as a photographic developer bath for automatic processing of X-ray film and as a replenisher therefor, consisting essentially of, per liter:

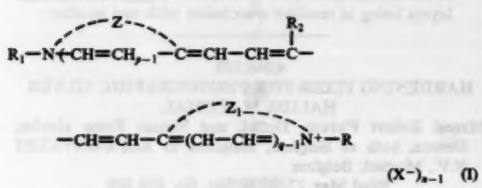
A 1-phenyl-3-pyrazolidone photographic developer	0.8 to 1.8g
Hydroquinone or a derivative thereof	15 to 35g
Bromide ion	0 to 4g
Organic anti-foggant and film speed restrainer	7 to 26 mmol
Alkaline material and buffer to provide a pH at 25° C of 10.0 + 0.8 − 0.5	

4,046,572
SILVER HALIDE PHOTOGRAPHIC LIGHT SENSITIVE MATERIAL

Masanao Hinata; Yuji Mihara; Akira Sato, and Tadashi Ikeda, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 30, 1976, Ser. No. 701,271
Claims priority, application Japan, June 30, 1975, 50-81182
Int. Cl.² G03C 1/76, 1/20
U.S. Cl. 96—69 **28 Claims**

1. A silver halide photographic light-sensitive material comprising a support having coated thereon at least one photographic emulsion layer containing a dicarbocyanine dye represented by general formula (I):



wherein R represents a sulfo group-containing alkyl group or a carboxy group-containing alkyl group, R_1 represents an aralkyl group or an aryloxyalkyl group, R_2 represents a hydrogen atom, a halogen atom, an alkyl group or an aralkyl group, p and q represent 1 or 2, n represents 1 or 2 and when n equals 1 the dye forms an intermolecular salt, X represents an anion and Z and Z_1 each represent the non-metallic atoms necessary to complete a thiazole nucleus, selenazole nucleus, oxazole nucleus, quinoline nucleus, 3,3-dialkylindolenine nucleus, imidazole nucleus or pyridine nucleus.

4. A silver halide color photographic light-sensitive material defined by claim 1, wherein at least three light-sensitive emulsion layers are present: a red-sensitive emulsion layer, a green-sensitive emulsion layer and a blue-sensitive emulsion layer.

4,046,573

COLOR PHOTOGRAPHIC MATERIALS

Kozo Inouye; Kotaro Nakamura; Yukio Yokota; Kiyoshi Nakazyo, and Akio Okumura, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 24, 1976, Ser. No. 669,935
Claims priority, application Japan, Mar. 24, 1975, 50-35945
Int. Cl.[2] G03C *1/76, 1/00, 1/40*
U.S. Cl. 96—74 15 Claims

1. A color photographic material comprising a support having photographic silver halide emulsion layers and auxiliary layers thereon, with at least one of said photographic layers containing a non-diffusible colored coupler which releases, on coupling reaction with the oxidation product of a primary aromatic amino developing agent at development, a diffusible dye capable of being removed from the photographic layer, said non-diffusible colored coupler being represented by general formula (I):

$$A - O - SO_2 - R - B \quad (I)$$

wherein R represents an alkylene group having 1 to 10 carbon atoms; A represents an image forming coupler residue containing a phenol nucleus or a naphthol nucleus, and wherein the —O-SO_2-R-B group is bonded to the coupling position of the coupler residue and the group can be released upon oxidative coupling with an aromatic primary amine developing agent to form a dye; and B represents a residue containing a chromophore which renders the coupler colored and which consists of a dye component having its spectral absorption in the visible region.

4,046,574

COLOR PHOTOGRAPHIC MATERIAL WITH HOMOPHTHALIMIDE THIOETHER DEVELOPMENT INHIBITOR

Heinrich Odenwalder, Cologne; Erwin Ranz; Walter Puschel, both of Leverkusen, and Hans Vetter, Cologne, all of Germany, assignors to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 20, 1976, Ser. No. 650,676
Claims priority, application Germany, Jan. 24, 1975, 2502892
Int. Cl.[2] G03C *1/10, 1/40, 1/48, 7/00*
U.S. Cl. 96—99 6 Claims

1. A light-sensitive color photographic material with at least one silver halide emulsion layer, containing at least one dye image producing compound and containing a development inhibitor releasing homophthalimide thioether compound capable of reacting with the oxidation product of an aromatic primary amino silver halide developing agent to form a releasable mercaptan capable of inhibiting photographic development the said homophthalimide thioether compounds are substituted with the sulfur of the thioether group in the 4-position and the nitrogen atom of the imido group in the 2-position of the homophthalimide is a tertiary nitrogen atom substituted with an alkyl, aryl, heterocyclic or an acylamino group.

4,046,575

COLOR PHOTOGRAPHIC MATERIAL CONTAINING 2-EQUIVALENT YELLOW COUPLERS

Immo Boie, Cologne, and Dieter Lowski, Bergheim, Erft, both of Germany, assignors to AGFA-Gevaert, Aktiengesellschaft, Germany

Filed June 5, 1974, Ser. No. 476,388
Claims priority, application Germany, June 9, 1973, 2329587
Int. Cl.[2] G03C *1/40*
U.S. Cl. 96—100 N 9 Claims

1. In a light-sensitive photographic material containing at least one silver halide emulsion layer and a 2-equivalent yellow coupler having an activated open-chain ketomethylene coupler structure in which one hydrogen of the methylene group is substituted by the nitrogen or a nitrogen-containing 5-membered heterocyclic ring that is photographically relatively inert except that it splits off from the coupler structure during chromogenic development, the improvement according to which the splittable nitrogen-containing five-membered heterocyclic ring is a C=C—N—C chain cyclized with C or O, and a benzene ring is fused to two carbons of the five-membered ring, adjacent the N.

4,046,576

PROCESS FOR PREPARING SILVER HALIDE EMULSION USING A SULFUR-CONTAINING RIPENING AGENT

James P. Terwilliger; Anthony D. Gingello, and Jong-Shinn Wey, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 7, 1976, Ser. No. 693,445
Int. Cl.[2] G03C *1/02, 1/28*
U.S. Cl. 96—108 19 Claims

1. In a process of continuously preparing a radiation-sensitive silver halide emulsion wherein

1. a silver salt and a halide salt capable of reacting to form radiation-sensitive silver halide grains are concurrently and separately continuously introduced into a reaction chamber in the presence of a peptizer and
2. radiation-sensitive silver halide emulsion is withdrawn continuously from the reaction chamber while silver halide grain formation is occurring under steady state operating conditions,

the improvement comprising

forming the silver halide grains in the presence of a sulfur-containing ripening agent chosen from the group consisting of thioether and thiocyanate ripening agents for silver halide grains, and

concurrently controlling and maintaining the total halide ion concentration at less than 0.01 molar.

4,046,577

PHOTOREACTIVE COMPOSITIONS COMPRISING POLYMERS CONTAINING ALKOXYAROMATIC GLYOXY GROUPS

Thaddeus M. Muzyczko, Downers Grove, and Thomas H. Jones, Naperville, both of Ill., assignors to The Richardson Company, Des Plaines, Ill.

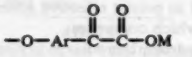
Continuation-in-part of Ser. No. 585,215, June 9, 1975, Pat. No. 3,969,119, which is a division of Ser. No. 267,475, June 29, 1972, Pat. No. 3,888,671. This application July 12, 1976, Ser. No. 704,384

The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.

Int. Cl.[2] G03C *1/68;* G03F *7/02;* G03C *5/00*

U.S. Cl. 96—115 R 63 Claims

1. A light sensitive composition comprising a polymer which includes as a recurring structure:



wherein Ar is a bivalent aromatic radical and M is selected from the class consisting of hydrogen, alkali metal, ammonium and substituted ammonium.

4,046,578

TYPE OF ADHESIVE CEMENT AND CERTAIN IMPROVED PRODUCTS MADE POSSIBLE THEREBY

David F. Smith, 101 Briny Ave. No. 607, Pompano Beach, Fla. 33062

Filed July 7, 1975, Ser. No. 593,885

Int. Cl.[2] C09K *3/00*

U.S. Cl. 106—35 10 Claims

1. An intimate mixture of finely-divided, dry zinc oxide and a dry, solid, weak, powdered, unpolymerized polycarboxylic acid which acid is such as to rapidly wet and largely dissolve in water, said mixture being maintained dry and unreacted until use; its dry particles being bonded together by a dry, water-insoluble agent in the amount of the order of about 1–2% by anhydrous weight of the mix which bonding agent does not materially interfere with rapid wetting of said mixture when contacted with water and, when wetted, rapidly becomes adhesive and quickly sets to a strong, hard cement; the proportions of said oxide and said acid in said mixture being from 10 to 400 percent of their chemical equivalence, said cement being relatively resistant to distintegration in water when the proportion of said oxide is such as to be at least chemically equivalent to the acid in said mixture.

4,046,579

DISPOSABLE PATTERN COMPOSITION

Tom Martin, 50 W. Wrightwood, Glendale, Ill. 60137

Filed July 18, 1975, Ser. No. 597,211

Int. Cl.[2] C08L *91/06*

U.S. Cl. 106—38.8 3 Claims

1. In a thermoplastic pattern forming composition comprising a thermoplastic pattern material, the improvement comprising a thermoplastic pattern forming composition having two phases containing, in admixture, said pattern material and finely divided 4,4'-isopropylidene diphenol not exceeding 100 mesh in an amount of from about 20% to about 70% by weight of the pattern forming composition.

4,046,580

SILICON NITRIDE-BASED SINTERED MATERIAL AND METHOD FOR MANUFACTURING THE SAME

Takashi Ishii, Tokyo; Katsutoshi Nishida, Yokohama; Michiyasu Komatsu, Yokohama, and Akihiko Tsuge, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed June 25, 1975, Ser. No. 590,073

Claims priority, application Japan, June 28, 1974, 49-73283; July 5, 1974, 49-76430

Int. Cl.[2] C04B *35/50, 35/58*

U.S. Cl. 106—55 9 Claims

1. A silicon nitride-based sintered material containing silicon yttrium oxynitride crystal compounds prepared from silicon nitride and yttrium oxide, wherein the amount of yttrium present in said crystal compounds is 50 wt% or more based on the total amount of yttrium contained in said silicon nitride-based sintered material.

4,046,581

REFRACTORY BINDER

John Edward Cassidy, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 27, 1974, Ser. No. 483,906

Claims priority, application United Kingdom, July 17, 1973, 33916/73

Int. Cl.[2] C04B *19/00*

U.S. Cl. 106—85 7 Claims

1. A solution of an aluminium phosphate binder in a diluent the solution comprising aluminium ions and phosphate ions in a molar ratio of Al:P of substantially 1:1 and other inorganic acidic anions, other than oxyphosphorus acid anions, the molar ratio of other acidic anions:Al being in the range 1.3:1 to 2:1.

4,046,582

AIR-ENTRAINING WATER-REDUCING AGENTS FOR CEMENT COMPOSITION

Yuichi Kawamura; Goro Hirano; Makoto Nagai, and Yasunobu Miura, all of Yokohama, Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

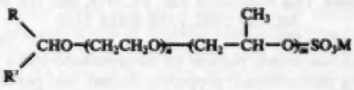
Continuation of Ser. No. 483,330, June 26, 1976, abandoned. This application Apr. 15, 1976, Ser. No. 677,187

Claims priority, application Japan, June 26, 1973, 48-71331; Feb. 13, 1974, 49-16828

Int. Cl.[2] C04B *15/02*

U.S. Cl. 106—88 7 Claims

1. A cement composition comprising a cement and an air-entraining water-reducing agent for the cement, comprising as an active ingredient a higher secondary alcohol oxyalkylene sulfate of the following general formula



wherein R and R' are alkyl groups with the sum of the total number of carbon atoms of both R and R' being about 10 to 20; *n* and *m* are each an integer of from 0 to 15, with $n+m$ being 1 to 15, and M is an alkali metal atom, an ammonium group or an amine group.

4,046,583

METHOD OF PRODUCING EXPANSIVE AND HIGH STRENGTH CEMENTITIOUS PASTES, MORTARS AND CONCRETES

Mario Collepardi, Rome, Italy, assignor to Emesa Aktiengesellschaft, Eschen, Liechtenstein

Filed May 10, 1976, Ser. No. 684,727
Claims priority, application Italy, May 9, 1975, 84122/75
Int. Cl.² C04B 7/35
U.S. Cl. 106—90 14 Claims

1. A method for producing expansive and high strength cementitions pastes, mortars, and concretes, comprising adding to a mix of water, cement and aggregates a mixture containing: a compound selected from the group consisting of calcium oxide, magensium oxide or mixture thereof, and a water-reducing agent capable of reducing the water/cement ratio of the mix at least about 15% at constant workability.

4,046,584

LIQUID CONCRETE ACCELERATING MIXTURES AND METHODS FOR USE THEREOF

Raymond C. Snyder, 5131 Princeton, Westminster, Calif. 92684, and Paul F. Snyder, 14281 Hacienda Drive, Huntington Beach, Calif. 92647

Filed Apr. 29, 1976, Ser. No. 681,504
Int. Cl.² C04B 7/35
U.S. Cl. 106—90 9 Claims

1. An accelerated setting concrete which comprises:
1. a liquid concrete composition containing cement, aggregate and water; and
2. an accelerating additive therefore in an amount from 0.5 to 10 weight percent, sufficient to accelerate setting of said concrete and comprising on a weight basis:
a. from 15 to 40 percent alumina
b. from 10 to 25 percent sodium expressed as the oxide;
c. from 10 to 25 percent potassium expressed as the oxide; and
d. the balance being water.

4,046,585

COMPOSITION AND METHOD FOR BINDING LIGNOCELLULOSIC MATERIALS

Kuo-Cheng Shen, Ottawa, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 338,562, March 6, 1973. This application Mar. 20, 1975, Ser. No. 560,131
Int. Cl.² C08L 97/02
U.S. Cl. 106—123 LC 9 Claims

1. A composition for binding lignocellulosic materials comprising a concentrate containing lignin sulfonate treated with sulfuric acid to provide a pH of not more than 1.5 measured as a 50% solids solution of the concentrate.

4,046,586

STABILIZED PHOTOCHROMIC MATERIALS

Donald R. Uhlmann, Newton; Elias Snitzer, Wellesley; Richard J. Hovey, Sturbridge; Nori Y. C. Chu, Southbridge, all of Mass., and Joseph T. Fournier, Jr., Storrs, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 498,506, Aug. 19, 1974, abandoned. This application Jan. 27, 1975, Ser. No. 544,078
Int. Cl.² C08L 1/10; G02B 5/23
U.S. Cl. 106—194 24 Claims

1. A photochromic particle for incorporation into a host for imparting photochromic properties thereto, said particle comprising:
an inorganic crystalline halide material selected from the group consisting of chloride, bromide, iodide, and mixtures thereof whose dimensions lie in the range between approximately 30 Angstroms and 10,000 Angstroms, said material being capable of changing to a higher energy, light absorbing state when exposed to activating radiation; and
a coating on the surface of said crystalline material said coating being an inorganic non-oxide coating, the coating volume being less than about 100 times the volume of said material and being effective to render the particle impervious both to halogen diffusion out of the crystal produced during photoactivation and impervious to host chemistry.

4,046,587

PRIMER COMPOSITION, PROCESS FOR USING SAME AND PRODUCT OBTAINED THEREBY

Richard J. Guglielmo, Sr., Lambs Lane, Cresskill, N.J. 07626

Filed Dec. 23, 1975, Ser. No. 643,699
Int. Cl.² C08K 5/02; C08L 9/06; C09D 3/393
U.S. Cl. 106—271 5 Claims

1. A primer composition for treating a polyolefinic-containing foam material to permit effective adhesion of a polyvinyl coating thereon which comprises:
a chlorinated hydrocarbon solvent in which there is admixed a resin material selected from the group consisting of a chlorinated paraffin wax, an acrylic type ester polymer and a vinyl copolymer, and mixtures thereof, said material constituting of from 2 to 10 percent by weight of said primer composition.

4,046,588

METHOD FOR THE MANUFACTURE OF A LEAD CHROMATE-CONTAINING PIGMENT HAVING A LOW ACID SOLUBLE LEAD CONTENT

Johan Jozef Einerhand; Gerardus Johannes Baptist Colbers, both of Maastricht; Wilhelmus Martha Andreas Huck, Elsloo, and Herman Jozef Johannes Maria Geurts, Kerkrade, all of Netherlands, assignors to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 647,953, Jan. 9, 1976, abandoned. This application Aug. 24, 1976, Ser. No. 717,414
Claims priority, application Netherlands, Jan. 13, 1975, 7500365
Int. Cl.² C09C 1/20
U.S. Cl. 106—298 9 Claims

1. A process for producing a lead chromate-containing pigment having an acid soluble lead content expressed as PbO of less than 5% by weight of the pigment and consisting essentially of mixed crystals of lead chromate and lead sulfate, said process comprising: forming an aqueous suspension of a lead chromate-lead sulfate precipitate by contacting under acid conditions in the presence of chloride and aluminum ions and in the absence of a buffering agent an aqueous chrome solution containing chromate and sulfate ions with an aqueous solution containing sufficient lead ions to provide an excess of 0.01 to 0.10 mole of lead ions per mole of chromate and sulfate ions present in said chrome solution; adding to the suspension a coating amount of a silicon compound and a trivalent antimony compound and precipitating said compounds as a surface coating on said precipitate; adjusting the pH of the resulting suspension to below 7; and recovering the coated precipitate as a pigment.

4,046,589

CALCIUM-SILICO-ZIRCONATE PRIMER PIGMENT

James Francis Higgins, Livingston, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 24, 1976, Ser. No. 726,292
Int. Cl.² C09C 1/28
U.S. Cl. 106—299 2 Claims

1. A method of imparting corrosion-inhibition to a primer by formulating into the primer from 0.1% to 65% by weight of calcium-silico-zirconate of the formula $xCaO.SiO_2.ZrO_2$, wherein x is from 2.75 to 3, based on the weight of the primer.

4,046,590

PROCESS FOR THE PRODUCTION OF A COLORLESS SUGAR SYRUP FROM CANE MOLASSES

Richard Riffer, Berkeley, Calif., assignor to California and Hawaiian Sugar Company, San Francisco, Calif.

Filed Sept. 8, 1976, Ser. No. 721,197
Int. Cl.[2] C13D *3/14, 3/12;* C13J *1/06*
U.S. Cl. 127—46 B 9 Claims

1. A process for producing a sugar solution from cane molasses comprising the steps of:
   a. diluting said molasses with water,
   b. heating said molasses,
   c. centrifuging said molasses to remove insoluble solids,
   d. acidifying said molasses to a pH of about 4,
   e. immediately passing said acidified heated molasses through an ion-exclusion resin wherein sugars are adsorbed and impurities are excluded, and
   f. passing water over said resin to elute and recover sugar solution from said resin.

4,046,591

METHOD FOR CLEANING THE EPIDERMIS USING A MAGNETIC FIELD

René Laguerre, 20 Allee du Mail, Meudon la Foret, France (92360)

Filed Apr. 21, 1975, Ser. No. 569,652
Claims priority, application France, Apr. 23, 1974, 74.14086; Apr. 9, 1975, 75.11101
Int. Cl.[2] B08B *7/00*
U.S. Cl. 134—1 11 Claims

1. A method of cleaning the epidermis of the skin comprising the steps of

applying onto the epidermis a particulate substance comprising particles having a grain size between 10 and 80 microns and which can be displaced by the action of a magnetic field, the particles having a shape for penetrating the pores and hollows of the skin without injuring the skin;

causing by massaging said particulate substance to penetrate the pores and hollows of the skin and to insert between the dead cells of the skin and the waste products excreated by the skin;

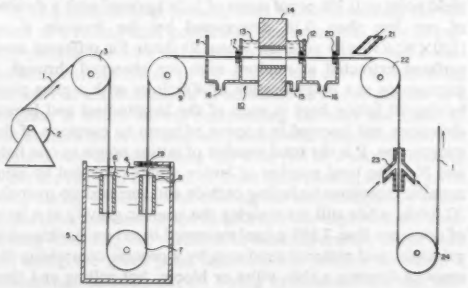
applying and moving on the surface of the epidermis a magnetic field having its action concentrated on a width and length not exceeding a few millimeters, and retracting said particulate substance by action of said magnetic field, carrying therewith a part of said dead cells and waste products from the skin.

4,046,592

WIRE CLEANING SYSTEM

Dean C. Westervelt, Acme; Luciano C. Scala, Murrysville; Howard E. Saunders, Pittsburgh, and David F. Ciliberti, Murrysville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 12, 1976, Ser. No. 648,431
Int. Cl.[2] B08B *3/10, 3/12;* C25F *1/00*
U.S. Cl. 134—1 11 Claims



1. A method of cleaning wire comprising

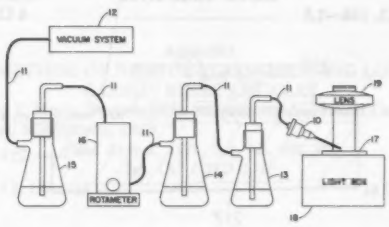
1. passing said wire through a graphite tube;
2. providing an alkaline aqueous solution between said tube and said wire;
3. passing an electric current which is at least half direct current between said wire and said graphite tube with said graphite tube as the anode; and
4. ultrasonically rinsing said wire.

4,046,593

METHOD FOR COLLECTING SPORES FROM A MOLD

Frederick H. F. Au, and Werner F. Beckert, both of Las Vegas, Nev., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Division of Ser. No. 615,962, Sept. 23, 1975, Pat. No. 3,983,007.
This application June 17, 1976, Ser. No. 696,998
Int. Cl.[2] B08B *5/04*
U.S. Cl. 134—21 1 Claim



1. A method for collecting spores from a mold with essentially no contamination by mycelial fragments composed of the steps of: contacting the spores with a vacuum apparatus having therein a filter permeable to the passage of air therethrough, and controlling the airflow through the vacuum apparatus to about 1.6 liters per minute such that essentially only the spores are drawn thereinto and collected on the filter with essentially no contamination by mycelial fragments.

4,046,594

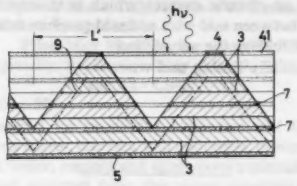
SOLAR BATTERY

Yasuo Tarui, Higashi-Kurume; Tsunenori Sakamoto, and Yoshio Komiya, both of Tonashi, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 26, 1976, Ser. No. 670,756
Claims priority, application Japan, June 19, 1975, 50-73658
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 SJ 6 Claims

1. A solar battery of homoepitaxial or heteroepitaxial structure comprising a series connected stack of alternately arranged planar layers of *p* and *n* semiconductor material, each pair of adjacent layers of opposite conducting type forming a photovoltaic junction therebetween, each said junction being parallel to the plane of the layers, with ohmic electrodes lying between each said pair, said stack having top and bottom major surfaces and a plurality of grooves in the top major surface of said stack, said grooves extending through said planes of the said junctions, the exposed surfaces of said grooves being inclined to said junction planes for receiving impinging radiation.

2. A solar battery according to claim 1 wherein said stack has a plurality of grooves in the bottom major surface of said stack and extending through said planes of said junctions, the exposed surfaces of said grooves in the bottom surface of said



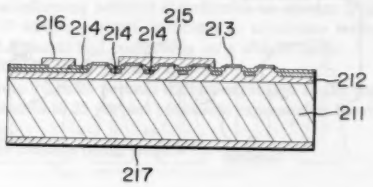
stack being inclined to said junction planes, the grooves in the top surface of said stack and the grooves in the bottom surface of said stack thereby providing a zig-zag appearance in longitudinal section.

4,046,595

METHOD FOR FORMING SEMICONDUCTOR DEVICES

Yoshio Ohkubo, Takatsuki, and Yoshichika Kobayashi, Ibaraki, both of Japan, assignors to Matsushita Electronics Corporation, Japan

Filed Oct. 14, 1975, Ser. No. 621,844
Claims priority, application Japan, Oct. 18, 1974, 49-120912
Int. Cl.² H01L *21/26*
U.S. Cl. 148—1.5 **4 Claims**



1. The method of forming semiconductor devices comprising:

forming at least one recess on a surface of a semiconductor substrate;

applying an etchable coating material on said surface of the substrate in such manner that the layer in the recess is thicker than that on the projecting portion; etching the layer of said coating material uniformly at the same rate until such time as the projecting portion is bared, whereas the recess is still covered with the coating material and stopping the etching of said coating material after said time and before the coating material in the recess has been removed;

forming one conductivity region in the projecting portion of said semiconductor substrate.

4,046,596

PROCESS FOR PRODUCING SPECTACLE FRAMES USING AN AGE-HARDENABLE NICKEL-BRONZE ALLOY

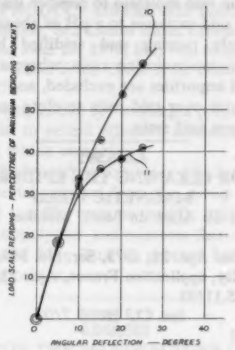
Richard T. Metcalfe; George A. Granitsas, both of Sturbridge, Mass., and Edgar H. Elliott, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed June 27, 1975, Ser. No. 591,189
Int. Cl.² C22F *1/08*; G02C *13/00*
U.S. Cl. 148—2 **5 Claims**

1. In a process of making spectacle frames with high tensile strength and good resistance to permanent set of frame from a plurality of parts by brazing, the improvement comprising,

preparing a precursor alloy shape capable of subsequent working to make spectacle frame parts, said shape characterized by softness and being of a nickel bronze alloy, the alloy consisting essentially of about 2–10 percent tin, from about 3–26 percent nickel, with the rest being copper, there being minor amounts of manganese to impart ductility to the alloy, and less than about 1 percent of other elements, said shape having been rendered soft by subjecting the alloy thereof to prolonged heating in the range of about 600° C. to about 950° C. for a time period sufficient to obtain the easily workable soft condition,

forming a part of a spectacle frame from said alloy in the



course of which said shape is reduced on the order of 10–75 percent in area to thereby impart cold working characteristics and thus some hardening to the frame part being made,

brazing said part to another of said plurality of parts,

heating said frame part to age it at a temperature in the range of about 300° C. to about 450° C. for about 1 to 6 hours in order to promote precipitation of a phase in the alloy, which phase is characterized by the chemical formula Ni_2Sn, to thereby obtain a spectacle frame part characterized by high tensile strength and good resistance to permanent set.

4,046,597

VIBRATION DAMPING STEEL MATERIAL AND PROCESS FOR PRODUCING THE SAME

Hiroshi Takechi; Mitsunobu Abe; Matsuo Usuda, all of Kisarazu, and Kunihiko Komiya, Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Japan

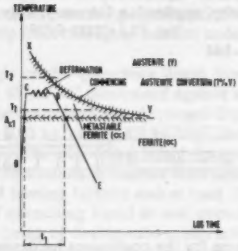
Filed Dec. 9, 1976, Ser. No. 749,082
Int. Cl.² C21D *7/14*
U.S. Cl. 148—12 R **3 Claims**

1. A vibration damping steel material consisting essentially of C ≦ 0.10% and Mn ≦ 0.40%, said material having a lower yield point or 0.2% proof stress of 7–28 kg/mm² with a d value of not less than 0.18 determined by the formula $d = (100 \times N)/(30 \times P)$ wherein when 30 fields for different steel surfaces extracted at random each are observed through a microscope at a magnification of 400 times with a glass plate having 20 lattice lines in each of the longitudinal and lateral directions and inserted in a space adjacent an eyepiece of the microscope, P is the total number of lattice points in one field and N is the total number of lattice points occupied by nonmetallic inclusions including carbide and summed up over the 30 fields, while still maintaining the specific gravity at a level of not more than 7.859 g/cm³ measured based on Archimedes' principle, said material produced by a process comprising the steps of forming a slab, billet or bloom, hot rolling and then annealing at a temperature of 680°–900° C for not less than 40 seconds but not more than 3 minutes.

4,046,598
PROCEDURE FOR MANUFACTURE OF STEEL BAND OR STRIP

Bo Lennart Janzon, Storfors, Sweden, assignor to Uddeholms Aktiebolag, Uddeholm, Hagfors, Sweden

Filed Jan. 22, 1976, Ser. No. 651,474
Claims priority, application Sweden, Jan. 22, 1975, 75006536
Int. Cl.² C21D 7/14
U.S. Cl. 148—12 R 6 Claims



1. A process for the manufacture of a band or strip of a steel comprising spheroidal carbide particles in a ferritic base which comprises heating a steel, the major part of which is, structurally, at least one carbonaceous ferritic austenite conversion product selected from the group consisting of lamellar perlite, granular perlite, sorbite, bainite and martensite, to a temperature which is above the $A_{c'}$-temperature for that steel and within the ferritie metastability range for that steel, rolling the steel at a temperature in the said metastable temperature range, and then cooling the steel to below the $A_{c'}$-temperature, the heating, rolling and cooling taking place in a time short enough to ensure that no substantial conversion to austenite occurs in the steel.

4,046,599
PROCESSING WIRE ROD

Mario Economopoulos, Liege, Belgium, assignor to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie, Brussels, Belgium

Filed Jan. 6, 1976, Ser. No. 646,887
Claims priority, application Belgium, Jan. 10, 1975, 824313
Int. Cl.² C21D 9/52
U.S. Cl. 148—12 B 5 Claims

1. In a method of processing steel wire rod leaving the last stand of a rolling mill, comprising the sequential steps of rapidly cooling the wire rod down to between 850° C and a temperature corresponding to the nose of the curve representing the start of transformation of austenite to ferrite-pearlite in a diagram in which curves representing the start and finish of transformations in the steel are plotted with respect to time and temperature, and subjecting the wire rod to a second cooling while the rod is in the form of loose turns passing along a given path, during which second cooling the steel completely transforms from austenite to ferrite-pearlite, the improvement comprising observing the variation of the temperature of the wire rod along the given path, detecting the position at which a temperature increase occurs owing to recalescence, and subjecting the wire rod to localized supplementary cooling at the position.

4,046,600
METHOD OF PRODUCING LARGE DIAMETER STEEL RODS

Noboru Yamakoshi, Kobe; Tsugio Kaneda, Akashi; Nobuyasu Hatsuoka, Gogatsuka; Shinichi Shimazu; Tatsu Fujita, both of Kobe; Yoshiro Yamada, Akashi; Tetsuo Yamada, and Atsuo Mizuta, both of Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

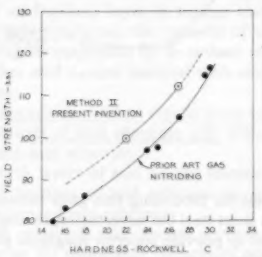
Filed Dec. 17, 1974, Ser. No. 533,508
Claims priority, application Japan, Dec. 17, 1973, 48-141691; Dec. 17, 1973, 48-141692
Int. Cl.² C21D 7/14
U.S. Cl. 148—12.4 1 Claim

1. A method for producing a large gauge, high strength steel rod having a diameter of not less than 9 mm, which comprises subjecting a high carbon steel rod billet consisting essentially of from 0.65 to 0.9% C, from 0.15 to 1.5% chromium, less than 2.0% silicon, less than 1.5 manganese, at least one element from the group consisting of aluminum, niobium, vanadium zirconium and titanium in an amount of less than 0.3% in total, balance essentially iron, to hot rolling immediately followed by a controlled cooling treatment, by the use of an air cooling medium, so as to effect a phase transformation to obtain a structure consisting essentially of fine pearlite, whereby a steel rod having a tensile strength of above 115 kg/mm² is produced without any re-heating treatment, wherein the resulting steel rod has the mechanical properties such that it may subjected to a reduction in area is excess of 35% without requiring heat treatment.

4,046,601
METHOD OF NITRIDE-STRENGTHENING LOW CARBON STEEL ARTICLES

Rollin E. Hook, Dayton, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed June 1, 1976, Ser. No. 691,245
Int. Cl.² C21D 1/48
U.S. Cl. 148—15 14 Claims



1. A method for internal strengthening of articles formed from a deep drawing quality steel sheet of strip stock, which comprises:

providing a vacuum decarburized and deoxidized steel melt containing, in weight percent, from about 0.002 to about 0.015% carbon, up to about 0.012% nitrogen, up to about 0.08% aluminum, about 0.05 to about 0.6% manganese, up to about 0.035% sulfur, up to about 0.01% oxygen, up to about 0.01% phosphorus, up to about 0.015% silicon, about 0.02 to about 0.3% titanium in solution, up to about 0.3% columbium in solution, and remainder iron except for incidental impurities, columbium when present being added in an amount of at least 0.025% in solution, with the sum total of titanium and columbium in solution not exceeding about 0.3%;

reducing said steel to final thickness by steps involving casting, hot rolling to strip thickness, removing the hot mill oxide scale, and cold rolling to strip or sheet thickness;

annealing to obtain a fully recrystallized, ductile, deep drawing steel strip or sheet;

forming said article from said annealed strip or sheet;

heating said article at a temperature of about 570° to about 580° C in a nitriding fluid chosen from the group consisting of a fused salt nitriding bath, and a gaseous nitriding atmosphere, whereby to form on the surfaces of said article an epsilon iron nitride layer, said heating being conducted in said fluid for a period of time, proportional to the thickness of said steel strip or sheet, sufficient to provide a total nitrogen concentration at least substantially equal to the amount theoretically required to combine completely with said titanium, aluminum and columbium in said steel; and

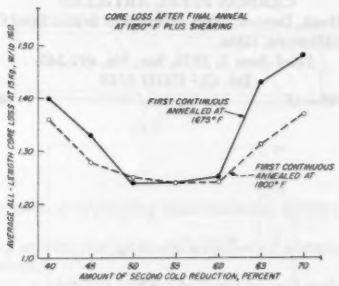
diffusion annealing said article in a non-nitriding fluid at a temperature of about 595° to about 815° C for a period of time, dependent on said strip or sheet thickness, sufficient to complete through-thickness strengthening by reaction of said nitrogen with said titanium, aluminum and columbium.

4,046,602

PROCESS FOR PRODUCING NONORIENTED SILICON SHEET STEEL HAVING EXCELLENT MAGNETIC PROPERTIES IN THE ROLLING DIRECTION

Edward B. Stanley, Washington Twp., Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1976, Ser. No. 677,200
Int. Cl.² H01F *1/04*
U.S. Cl. 148—111 **1 Claim**



1. A process for producing thin-gage substantially non-oriented silicon sheet steel but nevertheless having a slight degree of orientation to provide superior magnetic properties in the rolling direction the steps comprising:

a. forming a steel slab consisting of 2.0 to 3.5% silicon, 0.30 to 0.45% aluminum, not more than 0.007% sulfur with the balance iron and usual impurities;

b. heating said slab to a temperature within the range 2150° to 2250° F;

c. hot rolling said slab to hot band gage;

d. pickling the hot rolled steel;

e. cold rolling said steel with a two step cold reduction wherein the second cold roll effects a thickness reduction of from 50 to 60% and the steel is given an intermediate anneal between the two cold rolls at a temperature of from 1625° to 1800° F;

f. annealing the cold rolled steel at a temperature of 1450° to 1500° F in a wet atmosphere sufficient to decarburize said steel; and

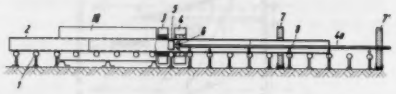
g. finally annealing the decarburized steel at a temperature of from 1700° to 1900° F in a nonoxidizing atmosphere to develop superior magnetic properties in the rolling direction; said final annealed steel, when rolled to 29-gage, characterized by an all length 15KG core loss of less than 1.50 w/lb/60 and permeability of more than 2200.

4,046,603

PROCESS FOR THE CONTINUOUS HARDENING OF TUBES

Helmut Landgraf, Rumeln-Kalden-hausen; Herbert Forster, Dusseldorf, and Karl Meurer, Krefeld, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed July 2, 1975, Ser. No. 592,784
Claims priority, application Germany, July 5, 1974, 2432923
Int. Cl.² C21D *9/08*
U.S. Cl. 148—144 **12 Claims**



1. The process for the continuous hardening of thick-walled steel tubes, comprising the steps of:

horizontal supporting and helically advancing at a uniform speed a plurality of said tubes arranged end to end;

pre-heating said tubes to a temperature at which they still have sufficient shape-retaining ability in the range of about 500 to 600 degrees C.;

successively externally heating said tubes to an austenizing temperature by heating gas, flames, radiators, in inductive currents;

successively heating said tubes internally by radiation or electroinductively;

sucessively and simultaneously quenching said tubes externally and internally by a liquid cooling medium;

successively and temporarily accelerating the speed of advance of the tubes from time to time after hardening, dividing the substantially continuous line of tubes and longitudinally spacing the individual tubes;

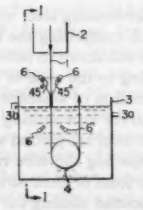
and during external heating of the tubes, controlling the depth of heat penetration to less than the thickness of the tube wall.

4,046,604

METHOD FOR CONTINUOUSLY QUENCHING ELECTROLYTIC TIN-PLATED STEEL STRIP WHILE PREVENTING QUENCH STAINS

Hidehisa Yamagishi, and Mizuo Tanaka, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 669,838
Claims priority, application Japan, Apr. 30, 1975, 50-52216
Int. Cl.² C21D *9/52*; C25D *5/50*
U.S. Cl. 148—156 **2 Claims**



1. In a method for continuously quenching a moving, continuously electrolytic tin-plated steel strip while preventing quench stains, which comprises spraying streams of quenching liquid uniformly onto both surfaces of a continuously electrolytic tin-plated steel strip, having a tin-plated layer fused by

heating in a heating furnace, and moving substantially vertically downward from said heating furnace, said streams of quenching liquid being sprayed on substantially the same horizontal level over the entire width of said strip, in the air below said heating furnace and above the surface of a quenching liquid in a quenching tank located below said heating furnace, thereby quenching said strip to solidify said fused tin-plated layer; and then, immediately, directing said strip further substantially vertically downward and passing said strip through the quenching liquid in said quenching tank, thereby further quenching said strip; the improvement which comprises: spraying the streams of quenching liquid uniformly onto both surfaces of said strip from two spray nozzles under the following conditions:

1. Spraying angle of the quenching liquid from said spray nozzles: from 45° to 75° downward against said strip,
2. Pressure of the quenching liquid sprayed from said spray nozzles: from 0.05 kg/cm² to 4.0 kg/cm², and
3. Position where the quenching liquid sprayed from said spray nozzles first comes in contact with said strip: in the air below said heating furnace and at least 25 mm above the surface of quenching liquid in said quenching tank;

said spray nozzles being of double-tube construction based on the concentric combination of an inner tube and an outer tube, said spray nozzles having a longitudinal slit of a length substantially equal to the width of said strip through which the streams of quenching liquid are sprayed onto said strip, and said spray nozzles being located one opposite the other symmetrically on both sides of said strip moving substantially vertically downward, in parallel therewith and on substantially the same horizontal level, in the air below said heating furnace and above the surface of quenching liquid in said quenching tank.

4,046,605

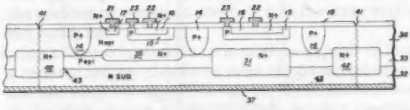
METHOD OF ELECTRICALLY ISOLATING INDIVIDUAL SEMICONDUCTOR CIRCUITS IN A WAFER

Carl T. Nelson, Sunnyvale, and Brian E. Hollins, Los Altos, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 432,853, Jan. 14, 1974, abandoned. This application July 31, 1975, Ser. No. 600,814

Int. Cl.² H01L *21/20, 21/66, 21/78*

U.S. Cl. 148—175 **9 Claims**



1. In a method of electrically isolating individual semiconductor circuits in a wafer having a plurality of said semiconductor circuits formed therein, said wafer being of the type having first and second layers of a first conductivity type separated by an intervening third layer of a second conductivity type, said transistor circuits to be separated from each other and from the wafer into individual semiconductor chips by severing the wafer along intersecting boundary lines defining the boundaries of individual semiconductor circuit chips, the steps of:

forming a lateral isolation region of first conductivity type passing through the third layer and extending along the boundary line between individual semiconductor circuit chip portions so as to form a buried P-N junction between said lateral isolation region and the third layer between the third layer and each of the first and second layers along the individual chip boundary lines, whereby undesired leakage current between individual ones of the semiconductor circuits is prevented in the wafer to permit probe testing of the individual semiconductor chips prior to separating the individual circuit chips from the wafer.

4,046,606

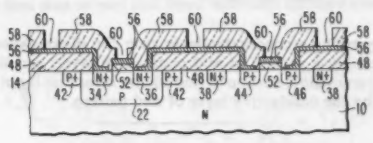
SIMULTANEOUS LOCATION OF AREAS HAVING DIFFERENT CONDUCTIVITIES

Herbert Paul Lambert, Morrisville, Pa., assignor to RCA Corporation, New York, N.Y.

Filed May 10, 1976, Ser. No. 684,967

Int. Cl.² H01L *21/225, 21/26*

U.S. Cl. 148—187 **7 Claims**



1. The process of introducing impurities into a substrate of material in the manufacture of a semiconductor device comprising the steps of:

a. forming a first layer of a first material over said substrate;
b. forming a second layer of a second material over said first layer, said second material being different from said first material;
c. preferentially etching portions of said second layer by an etchant which preferentially etches said second material with respect to said first material to expose the underlying portions of said first layer;
d. removing said exposed portions of said first layer to expose the underlying portions of said substrate;
e. forming a third layer of said second material over said exposed portions of said substrate;
f. simultaneously defining selected portions of said second and said third layers, then removing said selected portions of said third layer to expose the underlying portions of said substrate while simultaneously removing said selected portions of said second layer to expose the underlying portions of said first layer, the removal of said selected portions being accomplished by an etchant which preferentially etches said second material with respect to said first material;
g. depositing impurities of a first conductivity type onto the exposed portions of said substrate and introducing said impurities into said substrate
h. forming fourth layers of said second material only over the exposed portions of said substrate by reacting said exposed portions of said substrate;
i. removing the remaining said exposed portions of said first layer to expose the underlying portions of said substrate; and
j. depositing impurities of a second conductivity type different from said first conductivity type into said exposed portions of said substrate and introducing said impurities into said substrate.

4,046,607

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

Yasukazu Inoue, and Shoji Fujimoto, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed June 9, 1976, Ser. No. 694,359

Claims priority, application Japan, June 13, 1975, 50-71770

Int. Cl.² H01L *21/225*

U.S. Cl. 148—187 **13 Claims**

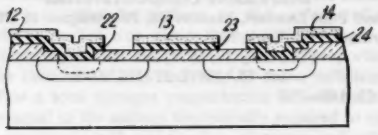
1. A method of manufacturing a semi-conductor device comprising the steps of:

forming a semiconductor region of one conductivity type in a semiconductor substrate;

forming a contact window in an insulating film covering the surface of said semiconductor substrate to expose at least a portion of the surface of said semiconductor region;

depositing a layer of silicon over the insulating layer;

introducing an impurity of said one conductivity type into said semiconductor region through said contact window;



depositing a conductive layer over the silicon layer;

defining a pattern in said conductive layer; and thereafter removing a portion of said silicon layer that is not covered by the conductive layer of said pattern.

4,046,608

METHOD OF PRODUCING SEMICONDUCTOR COMPONENTS AND PRODUCT THEREOF

Paul van Iseghem, Fislisbach; Thomas Vlasak, Birr, and Wolfgang Zimmermann, Klingnau, all of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Nov. 4, 1975, Ser. No. 628,842

Claims priority, application Switzerland, Nov. 4, 1974, 14718/74

Int. Cl.² H01L *21/225*

U.S. Cl. 148—188 **9 Claims**

1. In a method for producing semiconductor components with at least one junction and at least weakly N- or P-conducting zone containing from 10^{13} to 2.5×10^{14} doping atoms/cm³ and formed by diffusing the dopant atoms at elevated temperatures into appropriate zones of a semiconductor crystal from a nickel film containing said dopant deposited on the surface of said crystal, the improvement comprising:

cooling said in-diffused semiconductor crystal to room temperature at a rate of

$A/h^2 > (0.15 \pm 0.05)$, wherein

$A = 16.6 \int_o^t \exp(-2.381\ eV/kT\ (t'))\ dt'$,

T = temperature in °K as a function of the time during cooling,

t = time in seconds during cooling,

h = thickness of the semiconductor crystal in cm, and

k = Boltzman constant = 8.614×10^{-5} eV°K^{-1}

sufficient such that the specific resistance of said weakly doped zone is not changed by the nickel atoms which diffuse into the semiconductor crystal along with said doping atoms, thereby forming a semiconductor component having a voltage capacity greater than 2.5 kV.

4,046,609

METHOD OF MANUFACTURING PHOTO-DIODES UTILIZING SEQUENTIAL DIFFUSION

Jean-Louis Digoy, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 490,409, July 22, 1974, Pat. No. 3,978,511, which is a continuation of Ser. No. 381,105, July 20, 1973, abandoned, which is a continuation of Ser. No. 183,800, Sept. 27, 1971, abandoned. This application Feb. 25, 1976, Ser. No. 661,054

Claims priority, application France, Oct. 5, 1970, 70.35834

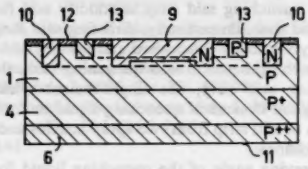
Int. Cl.² H01L *21/223, 31/10*

U.S. Cl. 148—189 **5 Claims**

1. A method of producing a diode comprising the steps of:

a. providing a semiconductor body of a first conductivity type and having a high resistivity;

b. carrying out from at least one surface of said semi-conductor body at least two successive diffusions with a higher concentration of doping impurities of the said first conductivity type, a first region of said semiconductor diode being formed by the portion of said semiconductor body that is substantially free of said diffused doping impurities and the diffused portion of said semiconductor body forming a more highly doped second region of said semiconductor body, said doping impurity concentration in said second region having a graded distribution such that said



impurity concentration increases with increasing distance from the interface between said first and second region;

c. reducing the thickness of said first region; and then

d. providing in said first region a zone of opposite conductivity type so as to form a diode junction in said first region.

4,046,610

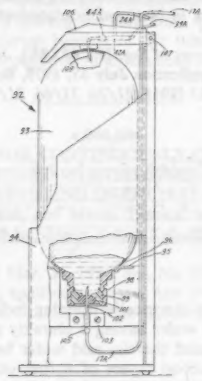
FLUID PRODUCT RESERVOIR AND METHOD

Duane F. Lilja, 2410 Central Ave. NE., Minneapolis, Minn. 55418

Division of Ser. No. 512,523, Oct. 7, 1974, Pat. No. 3,934,746, which is a continuation-in-part of Ser. No. 413,768, Nov. 8, 1973, Pat. No. 3,841,555, which is a continuation-in-part of Ser. No. 280,476, Aug. 14, 1972, Pat. No. 3,780,943. This application Dec. 8, 1975, Ser. No. 638,658

Int. Cl.² B32B *31/20*

U.S. Cl. 156—73.1 **11 Claims**



1. A method of closing a thermoplastic container of the type having an open neck with an outwardly facing ledge in the neck, said method comprising the steps of:

providing a thermoplastic plug having side wall means closely conforming to the interior wall of the neck;

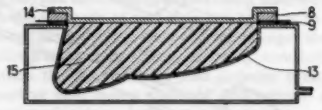
locating the plug in the neck of the container with a portion of the plug in contact with the ledge of the neck of the container; and

applying ultrasonic energy substantially simultaneously to the neck of the container and the plug at a location remote from the ledge and plug portion to weld together the ledge of the neck and the portion of the plug in contact with the ledge of the neck.

4,046,611
MANUFACTURE OF CUSHIONS

Joseph F. Sanson, 66, Avenue du Colonel Morlaix-Demozay, 45190 Beaugency, France

Filed Jan. 13, 1975, Ser. No. 540,555
Claims priority, application France, Jan. 15, 1974, 74.01274; Apr. 10, 1974, 74.12661
Int. Cl.² B29D 27/04; B29C 17/02; B32B 5/20
U.S. Cl. 156—79 13 Claims



1. A method of manufacturing a flexible cushion of foamed plastics material with an integrated cover of cloth that is resiliently stretchable, which comprises

placing a flat piece of cloth between complementary members of a preforming frame to dispose the cloth in substantially smooth unstretched condition with its margins projecting between said frame members;

exerting sufficient pressure on said frame members to restrain said cloth while permitting it to be slid between said members without causing stretching of the cloth to its elastic limit;

depressing said cloth centrally of said frame to draw the cloth margins inwardly between the frame members to cause peripheral contraction of said piece of cloth and to preform a pocket therein wherein the cloth is still in substantially unstretched condition, this pocket forming operation providing the major conformation of the cloth shaping to the mold surface but being discontinued prior to development of plaits in the cloth;

fixing the periphery of said piece of cloth in the plane of said preforming frame to retain said cloth as a preformed, essentially unstretched pocket having a peripheral flange and restrain said cloth against return to its original condition;

placing said preformed peripherally flanged pocket on a recessed vacuum mold having an inner surface configured to the desired shape of the finished cushion, sealing said peripheral flange of said pocket about the recessed mold and applying a vacuum to the mold to resiliently stretch the preformed pocket to conform it to the inner surface of the mold; and

placing a foamable reactive resin mixture capable of forming a resilient cellular thermoset resin in said stretched pocket and allowing it to expand in said mold and become bonded to the cloth therein so as to produce, when a condition of structural integrity of the foam has been reached, said flexible cushion with integrated cover.

4,046,612
METHOD FOR PRODUCING A BILAYERED GREEN CERAMIC TAPE

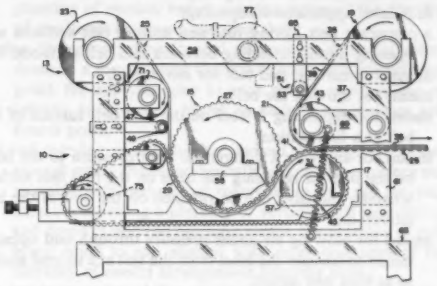
Leadom A. Warner, Sayre, and Joceph J. Cleveland, Wysox, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 555,406, March 5, 1975, abandoned, which is a division of Ser. No. 392,761, Aug. 29, 1973, Pat. No. 3,904,473. This application Apr. 2, 1976, Ser. No. 672,990
Int. Cl.² B29D 23/10
U.S. Cl. 156—205 4 Claims

1. A method for producing a bilayered green ceramic tape having a corrugated first layer and a substantially flat second layer bonded to a first side of said corrugated first layer, said method utilizing an apparatus including a forming means comprising a ribbed corrugating cylinder and a first portion of an endless ribbed belt, and bonding means comprising a flat surfaced cylinder and a second portion of said endless ribbed belt, said method comprising:

supplying said first layer of green ceramic material to said apparatus in substantially flat and pliable form;

applying an organic solvent to a second opposing side of said first layer, in order to form a tacky surface to enable said layer to stick to the first portion of the endless belt, and thus facilitate feeding of the layer after corrugation to the bonding means; corrugating said first layer having said organic solvent on said second opposing side, by passing said first layer between said ribbed corrugating cylinder and said first portion of said endless belt, engaging only said first side of said first layer with said ribbed cylinder,



and applying pressure against said second side of said first layer with said first portion of said endless belt;

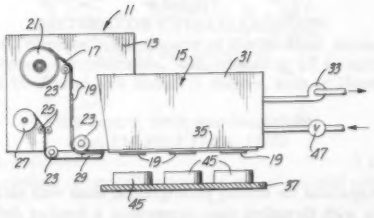
supplying said second layer of green ceramic material to said apparatus in substantially flat and pliable form; and

bonding a surface of said flat and pliable second layer to said first side of said corrugated first layer by passing said flat second layer and said corrugated first layer between said flat surface cylinder and a second portion of said endless belt, said endless belt applying pressure against said second side of said first layer in order to achieve a bond between said surface of said second layer and said first side of said corrugated first layer, thereby to form a bilayered green ceramic tape.

4,046,613
MATRIX LABEL APPLICATOR

Leo Kucheck, Irvine, and Michael Crankshaw, Sante Fe Springs, both of Calif., assignors to Label-Aire Inc., Fullerton, Calif.

Filed Mar. 8, 1976, Ser. No. 664,966
Int. Cl.² B32B 31/00; B29C 17/00
U.S. Cl. 156—249 27 Claims



1. A method of labeling articles comprising:

moving a plurality of labels arranged in a row along a label path at a labeling station with the axes of the row and the label path being generally parallel;

transporting articles nonparallel to the label path through the labeling station with the articles forming a column of articles at the labeling station and with the axis of the

column being generally parallel to the axes of the row and the label path;

carrying out said steps of moving and transporting until the labels of the row are in registry with the column of the articles at the labeling station;

transferring the labels of said row to the articles of said column; and

said step of moving includes providing a movable conveyor and using the conveyor to move the row of labels along the label path, and said method includes providing a single row of labels on a backing strip, removing the labels from the backing strip, transferring the labels to the conveyor, and spacing the labels on the conveyor further apart than the labels on the backing strip.

5. A label applicator comprising:

a conveyor belt having first and second belt surfaces and opening means extending between said belt surfaces;

means for moving said belt for movement;

means for moving the belt;

means for depositing a label on the first belt surface of the belt at a first station;

means for applying a differential fluid pressure to the label on the belt for retaining the label on the first belt surface whereby the label can be retained on the belt as the belt moves; and

means for blowing air under pressure through said opening means to transfer the label from the belt at a second station to at least one object.

4,046,614

SPLICING APPARATUS FOR PHOTOGRAPHIC FILMS OR THE LIKE

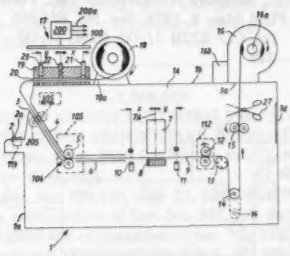
Wolfgang Zahn, Munich; Helmut Zangenfeind, Puchheim, and Günther Dömges, Oberhaching, all of Germany, assignors to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 16, 1976, Ser. No. 742,518

Claims priority, application Germany, Nov. 28, 1975, 2553611

Int. Cl.² B31F *5/00*

U.S. Cl. 156—353 **14 Claims**



1. Apparatus for uniting photographic films with each other and/or with threading tape, comprising a housing defining a dark chamber; a splicer installed in said chamber; guide means for directing the leaders of films and tape into the range of said splicer; a source of tape located ahead of said guide means, as considered in the direction of movement of tape into the range of said splicer; and means for treating the tape intermediate said source and said guide means, said treating means comprising means for severing the tape and means for applying indicia which facilitate the positioning of tape relative to said splicer.

4,046,615

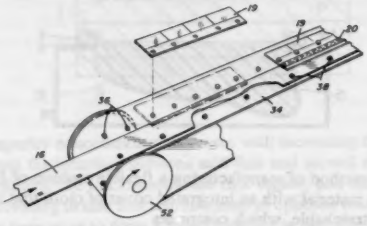
APPARATUS FOR LAMINATING FILM STRIPS TO A TRANSPORT WEB

John R. Jansen, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,740

Int. Cl.² B65H *17/40*; G03B *1/30*

U.S. Cl. 156—544 **7 Claims**



1. Apparatus for laminating film strips of a plurality of film sizes to a relatively long transport web, said apparatus comprising:

means for supplying the transport web to said apparatus;

interchangeable means for positioning film strips of a particular film size relative to the transport web;

means for selectively receiving one of a possible number of said interchangeable positioning means, thus enabling film strips of the particular film size to be positioned relative to the web by one of said interchangeable positioning means and film strips of another film size to be positioned relative to the web by another of said interchangeable positioning means;

each said interchangeable positioning means comprising a transport belt, means coupled to said transport belt for engaging the film strips and the transport web to establish the relative position therebetween, and means for advancing said transport belt so that the film strips and transport web are advanced in such established relative position for lamination; and,

means for laminating the film strips to the transport web in such established relative position.

4,046,616

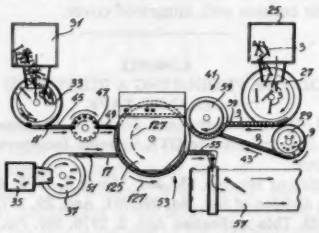
AUTOMATIC ASSEMBLY APPARATUS OF SYRINGES

Edward Klein, Montreal, Canada, assignor to V-Mark Automation Ltd., Canada

Filed Sept. 13, 1976, Ser. No. 722,595

Int. Cl.² B32B *31/00*; B65C *11/04*

U.S. Cl. 156—559 **3 Claims**



1. An apparatus for automatically assembling syringes, each said syringe comprising; a plunger having a stem, a top flanged end, and a bottom tip receiving end; a tip for mounting on said tip receiving end; a cylindrical barrel having a top flanged end and a bottom needle arrangement receiving end, said barrel receiving said plunger and tip in the interior thereof; and a

needle arrangement for mounting on said needle arrangement receiving end;

said apparatus comprising;

a sub-assembly station for mounting said tip on said plunger including a first rotary drum having a plurality of equally spaced vertical slots disposed around the periphery thereof, each said slot being open at the top end thereof and closed at the bottom end thereof, means for rotating said drum in a first direction, means for providing plungers to said drum to be inserted at the top ends of respective slots one at a time, said plungers being inserted in said slots with the top ends of said plungers being adjacent the top ends of the respective slots and the plunger stems extending downward in the slot, a gap being provided in said slot between the tip receiving end and the bottom of each respective slot, means disposed downstream in said first direction of said means for providing plungers, for providing tips in the gaps at the bottom ends of the slots one at a time, a camming surface disposed downstream, in said first direction of said means for providing tips, and located at the top end of said drum to engage the flanged top ends of the plungers as the drum rotates in said first direction, said cammed surface being sloped downwardly in the first direction, whereby the plungers are forced downwardly as they pass the camming surface, to force the tip receiving ends into the tips to mount the tips on the plunger and provide a plunger and tip arrangement;

a processing station for cleansing and lubricating said barrels comprising elongated first means connected to a source of cleansor, said elongated first means being movable by vertically upwardly and vertically downwardly first moving means, elongated second means connected to a source of lubricant, said elongated second means being movable by vertically upwardly and vertically downwardly second moving means, and stop and start moving means to moving said barrels to said processing station such that one barrel is disposed under said elongated first means and another barrel is disposed under said elongated second means during each stop condition, whereby, during each stop condition the elongated first means is inserted in said one barrel and withdrawn from said one barrel cleansing said one barrel during the insertion and withdrawal of said elongated first means, said elongated first means being inserted in said one barrel after the start of a stop condition and being withdrawn from said one barrel before the start of the following start condition and whereby, during each stop condition the elongated second means is inserted in said other barrel and withdrawn from said other barrel lubricating said other barrel during the insertion and withdrawal of said elongated second means, said elongated second means, said elongated second means being inserted in said other barrel after the start of a stop condition and being withdrawn from said other barrel before the start of the following start condition;

a main assembly station for assembling the plunger and tip arrangements, the processed barrels and the needle arrangement comprising; a second rotary drum having means for rotating said drum in an assembly direction; said second rotary drum having an upper carrying surface for receiving plunger and tip arrangements from said sub-assembly station at a first point on said second rotary drum, said upper carrying surface being movable with said second rotary drum and comprising a plurality of equally spaced vertical plunger and tip arrangement carrying slots disposed around the periphery of said second rotary drum; an upper camming surface disposed over the top of said upper carrying surface and sloping downward in said assembly direction, said upper camming surface being fixed relative to the motion of said second rotary drum, said upper camming surface engaging the top flanged ends as said upper surface moves past the upper camming surface in the assembly direction whereby to force the plunger and tip arrangements downwardly; a center carrying surface for receiving processed barrels from said processing station at a second point on said second rotary drum downstream of said first point, said center surface comprising a plurality of equally spaced vertical barrel carrying slots disposed around the periphery of the second rotary drum, said center carrying surface being movable with said second rotary drum; a lower carrying surface for receiving said needle arrangements at a third point on said second rotary drum downstream of said second point, said lower carrying surface comprising a plurality of vertical needle arrangement carrying slots disposed around the periphery of said second rotary drum, said lower surface being movable with said second rotary drum;

the plurality of said vertical plunger and tip arrangement slots being equal to and aligned with respective ones of the plurality of vertical barrel carrying slots and the plurality of needle arrangement carrying slots;

glue dispensor means located adjacent said second rotary drum at a fourth point thereof downstream of said third point, for applying glue to each needle arrangement receiving end of each barrel as each barrel reaches said fourth point;

a rod carrying means disposed around the periphery of said second rotary drum and beneath said carrying surface and movable with said second rotary drum, said rod carrying means comprising a plurality of vertical rods movable up and down in said rod carrying means, the plurality of rods being equal to and aligned with respective ones of the plurality of needle arrangement carrying slots;

a lower camming surface disposed below said rod carrying means and sloping upward in said assembly direction, the lower carrying surface being fixed relative to the motion of said second rotary drum, the lower camming surface engaging the bottom ends of said rods to force said rods upwardly;

the top end of said rods engaging the bottom ends of respective ones of said needle arrangement, whereby the needle arrangements are forced upwardly as the rods are forced upwardly;

constant pressure applying means in said lower camming surface disposed downstream of said glue dispensor means and adapted to apply constant pressure, through each said rods, to a respective needle arrangement, as it is being mounted on a respective barrel;

whereby, as said second rotary drum moves in the assembly direction each plunger and tip is inserted into a respective processed barrel, glue is applied to each barrel at the needle arrangement receiving end thereof, each needle arrangement is mounted on a respective barrel at the glued needle receiving end thereof, and constant pressure is applied to each needle receiving end to fix it to its respective barrel, to provide completely assembled syringes.

4,046,617

METHOD OF CRYSTALLIZATION

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Hans U. Walter, and Robert S. Snyder, both of Huntsville, Ala.

Filed Sept. 5, 1975, Ser. No. 610,801
Int. Cl.[2] B01J *17/06, 17/10*
U.S. Cl. 156—601 **2 Claims**

1. A method of crystallization of a rod of material comprising:

fixably supporting one end of the rod within a heat sink and otherwise extending the rod into a sealed enclosure, said enclosure being positioned in a substantially gravity-free environment, and said heat sink having surfaces outside of said enclosure;

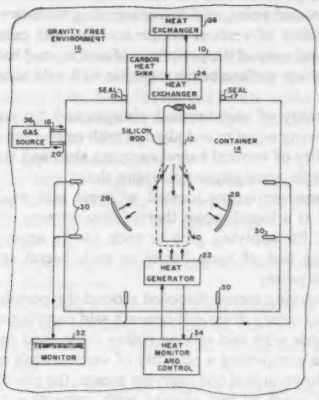
the interior of said enclosure containing a selected atmosphere;

directing heat onto an end region of said rod opposite the end region at which it is supported, whereby it is melted;

monitoring the temperature of selected regions of said rod and controlling the application of heat to said rod;

selectively reducing the application of heat, whereby heat to said rod flows to said heat sink, and solidification of the melted rod occurs progressively, moving radially outwardly and longitudinally in a direction away from the supported end of said rod; and

selectively transferring heat between said heat sink and a separate body, said separate body being external to said enclosure.



4,046,618

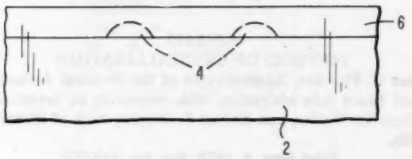
METHOD FOR PREPARING LARGE SINGLE CRYSTAL THIN FILMS

Praveen Chaudhari, Briarcliff Manor; Jerome John Cuomo, Bronx, and John Wauchope Matthews, Ossining, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 319,125, Dec. 29, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,194

Int. Cl.[2] B01J *17/08*

U.S. Cl. 156—603 **2 Claims**



1. A method of growing a single crystal thin film on a substantially inert substrate comprising the steps of:

depositing an amorphous film onto said inert substrate at a temperature below the crystallization temperature of said amorphous film to form a peripheral part of said amorphous film in a point;

locally heating said peripheral part of said amorphous film to its crystallization temperature to form a single crystal; and

passing continuously from said single crystal across said amorphous film a hot zone at a temperature below the melt temperature of said amorphous film but sufficiently high to propagate a crystalline phase through said amorphous film, whereby a single crystal thin film is produced.

4,046,619

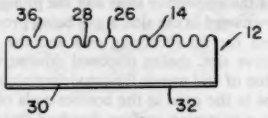
METHOD OF TREATING THE SURFACE OF A GLASS MEMBER

Stephen H. Rice, Forestville; Rodney S. Spencer, College Park, and Charles M. Fleetwood, Jr., Odenton, all of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 3, 1976, Ser. No. 682,435

Int. Cl.[2] C03C *15/00, 25/06*

U.S. Cl. 156—645 **9 Claims**



1. A method of treating a glass member intended to abut a transparent element for disrupting the light interference fringes formed therebetween, comprising the steps of:

grinding the surface of the glass member intended to abut the transparent element with a grinding powder of substantially 22.5 microns to form a multiplicity of alternating peaks and valleys, said peaks and valleys permitting nondetectable light interference fringes to form within said valleys when said transparent element contacts said peaks;

bathing said surface with an aqueous solution having a temperature range of between substantially 70° and 75° F. and containing between substantially 41.3% and 45.7% by volume of sulfuric acid and between substantially 54.3% and 58.7% by volume of hydrofluoric acid for a time period of between substantially 105 and 135 seconds for polishing said peaks and valleys until said glass member is about 90% light transmissive; and

washing said glass member with a liquid having a temperature range of between substantially 45° and 55° F. for preventing further reaction between said aqueous solution and said surface.

4,046,620

PROCESS FOR IMPROVING THE SOLDERABILITY OF ELECTRIC CIRCUIT BOARDS

Ernst Andrascek, and Hans Hadersbeck, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 8, 1976, Ser. No. 703,373

Claims priority, application Germany, July 11, 1975, 2531163

Int. Cl.[2] C23F *1/00*; B44C *1/22*

U.S. Cl. 156—666 **8 Claims**

1. A process for improving the solderability of a circuit board with conductor paths composed of copper, or copper alloy comprising the steps of

A. first contacting conductor paths on a circuit board at least at areas to be soldered with a first solution for a time of from about 1 to 50 minutes, said first solution comprising on a 100 weight percent total weight basis.

from about 2 to 20 weight percent of at least one dissolved non-ionic surfactant,

from about 1 to 20 weight percent of at least one dissolved organic acid capable of producing a pH of not larger than 2 in water solution at a concentration of less than 50 grams per lite, and

the balance up to 100 weight percent of any given such solution being water,

B. first flushing the so first contacted areas with water for a period of time of at least about 12 seconds,

C. secondly contacting the so first flushed areas with a second solution for a time of from about 2 to 10 minutes, said second solution comprising on a 100 weight percent total weight bases;

from about 0.5 weight percent up to solution saturation of dissolved potassium persulfate

sufficient added sulfuric acid to produce therein a pH of from about 1 to 4,

from and including 0 up to about 0.5 weight percent dissolved phosphoric acid, and

the balance up to 100 weight percent of any given such solution being water,

D. secondly flushing the so secondly contacted areas with water for a period of time of at least about 10 seconds,

E. thirdly contacting the so secondly flushed areas with a said first solution for a time of from about 1 to 5 minutes,

F. thirdly flushing the so thirdly contacted areas with water for a period of time of at least about 10 seconds, and

G. drying the so thirdly flushed areas in air.

4,046,621

PROCESS FOR TREATING A SLURRY OF CELLULOSIC MATERIAL

Ernest Arthur Sexton, St. Catharines, Canada, assignor to The Ontario Paper Company Limited, Thorold and Canadian International Paper Company, Montreal, both of, Canada

Division of Ser. No. 533,692, Dec. 17, 1974. This application Oct. 28, 1975, Ser. No. 625,819

Int. Cl.² D21C *9/06, 9/18*

U.S. Cl. 162—40 **7 Claims**

1. A process for treating a slurry of cellulosic material which comprises:

a. diluting the slurry to reduce its consistency to a flowable level;

b. depositing the diluted slurry on a surface permeable to the liquid and solid phases thereof but which is substantially more permeable to the liquid phase;

c. subjecting the deposited slurry to a pressure differential, whereby more of the liquid phase thereof than the solid phase passes through the permeable surface to increase the consistency of the slurry to a value between the consistency of the diluted slurry deposited on the surface and the consistency of the slurry prior to its dilution, thereby forming a mat of cellulosic material on said surface;

d. recycling substantially all of the liquid and solids which pass through the surface for use as the slurry diluent in step (a);

e. counter-currently applying a treating liquid in a plurality of treatment stages, including application of a fresh treating liquid in the last stage of said treatment stages, to the mat of cellulosic material, while the mat remains on the permeable surface and subject to the pressure differential, whereby the treating liquid displaces at least a portion of liquid present in the mat from the mat and through the permeable surface in each treatment stage;

f. measuring the electrical conductivity of the liquid displaced from the mat in the last stage of said treatment stages and then

g. adjusting the amount of fresh treating liquid applied in the last stage of said treatment stages in response to the deviation, from a predetermined norm, of the measured value of electrical conductivity of only the liquid displaced in the last stage of said treatment stages.

4,046,622

MULTI-PLY FIBROUS SHEETS HAVING A WET-LAID PLY AND A DRY-LAID PLY

Brian William Attwood, Bristol, and Dennis Raymond Hicklin, Bath, both of England, assignors to Karl Kroyer St. Anne's Limited, Bristol, England

Continuation of Ser. No. 485,266, July 2, 1974, abandoned. This application June 15, 1976, Ser. No. 696,184

Claims priority, application United Kingdom, Aug. 23, 1973, 40074/73

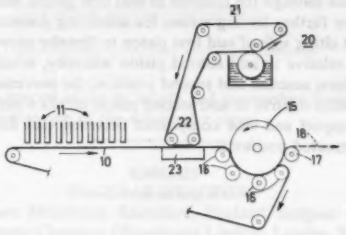
Int. Cl.² D21H *1/02, 1/06*

U.S. Cl. 162—132 **7 Claims**

1. A process for forming a multi-ply sheet of cellulosic fibrous material comprising the steps of:

dry-laying a mat of cellulosic fibrous material by depositing cellulosic fibers in a dry state via an airstream onto a main forming band to a thickness sufficient to form a distinct ply within a multi-ply sheet after the fibers of the mat have been caused to adhere together by the concurrent application of heat, moisture and pressure,

forming a web of cellulosic fibrous material by a wet-forming technique on an auxiliary forming band,



joining the web and the mat together under sufficient pressure to join them into a multi-ply sheet while concurrently consolidating the fibers of the dry-laid mat into a strong discernable ply by concurrently subjecting the mat to all three of moisture, heat greater than 150° F and pressure of not less than 50 p.s.i. by passing the joined multi-ply sheet through at least one press nip formed between at least one press roll and a heated cylinder wherein the dry-laid mat receives at least a major portion of the moisture it requires for such strength by transfer of moisture from the wet-laid web to the dry-laid mat.

4,046,623

APPARATUS FOR SHIFTING COMPONENT PARTS OF PAPER MACHINES

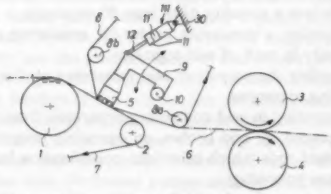
Heinrich Schmid, Schwabisch Gmund, Germany, assignor to J. M. Voith GmbH, Heidenheim (Brenz), Germany

Filed May 25, 1976, Ser. No. 689,793

Claims priority, application Germany, June 5, 1975, 25249381

Int. Cl.² D21F *1/24, 7/00*

U.S. Cl. 162—306 **10 Claims**



1. In a paper machine, a combination comprising a movable component, particularly a suction head or a pick-up roll, which is movable between an operative position, a retracted position and an intermediate position; a support connected to and movable with said component; a frame, and apparatus for moving said component between said positions, including a fluid-operated motor having a cylinder member, a piston rod member, a first piston reciprocable in said cylinder member and

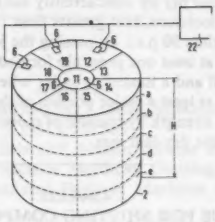
rigid with said piston rod member, a second piston slidably installed in said cylinder member at one side of said first piston, means for connecting one of said members to said frame, and means for connecting the other of said members to said support, said cylinder member having means for admitting pressurized fluid against that side of said second piston which faces away from said first piston to thereby move said second piston from a first to a second position whereby, when said first piston abuts against said second piston in said first position of said second piston, the movement of said second piston from said first to said second position entails a movement of said support and said component between said operative and intermediate positions through the medium of said first piston, said cylinder member further having means for admitting pressurized fluid against either side of said first piston to thereby move said first piston relative to said second piston whereby, when said second piston assumes said second position, the movement of said first piston relative to said second piston entails a movement of said support and said component between said intermediate and retracted positions.

4,046,624

METHOD OF OPERATING A NUCLEAR REACTOR

Werner Aleite, and Heinz-Wilhelm Bock, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 28, 1974, Ser. No. 501,352
Claims priority, application Germany, Sept. 17, 1973, 2346725
Int. Cl.² G21C 7/08
U.S. Cl. 176—22 **6 Claims**



1. A method of operating a pressurized water reactor having a reactor core with a core height of at least 3.5 meters and having control rods adjustable for controlling power, the rods being adjustable individually and sequentially in groups so as to maintain a uniform power distribution over the cross section of the core comprising:

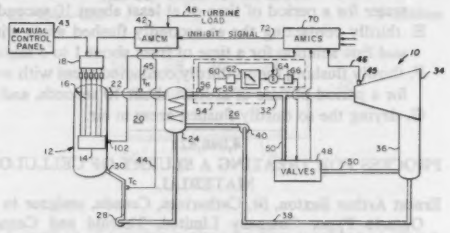
a. subdividing the reactor core both vertically and horizontally into a plurality of at least 50 segments;
b. disposing a measuring probe for measuring the power density in each of said segments;
c. coupling the outputs of said measuring probes to a computing apparatus;
d. computing in said computing apparatus, from the values measured by said probes, an operating program for the control rods which takes into consideration burn up and zenon poisoning;
e. using control rods which are adjustable over the height of the core and uniformly have only a small reactivity; and
f. coupling the output from said computing apparatus to control said control rods so as to move said rods in groups of between 1 and 10 whereby said control rods will be moved independently of power output changes over the height of the core in an irregular sequence in such a manner that local power peaks are avoided.

4,046,625

AUTOMATIC MOTION INHIBIT SYSTEM FOR A NUCLEAR POWER GENERATING SYSTEM

Charles Ronald Musick, Vernon, and Jose Marcelo Torres, Simsbury, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 18, 1975, Ser. No. 605,706
Int. Cl.² G21C 7/00
U.S. Cl. 176—24 **6 Claims**



1. A nuclear power generating system comprising:

coolant vapor generating apparatus including a nuclear reactor having a nuclear core and a plurality of control elements movable within said core for controlling the power output thereof;

a turbine for receiving coolant vapor produced by said vapor generating apparatus;

coolant circuitry for said vapor generating apparatus and said turbine including means for delivering vapor to said turbine;

coolant vapor relief means in said coolant circuitry operable to cause at least some of the coolant vapor to be diverted from said turbine, said coolant vapor relief means including a plurality of coolant vapor relief valves, at least some of said valves being operable automatically to divert coolant vapor;

means for generating a turbine load signal proportional to the quantity of steam received by said turbine;

means responsive to said reactor for generating a reactor power output signal commensurate with the reactor power output;

automatic motion control means responsive to turbine load and the power output of said nuclear core for automatically controlling the motion of said control elements within said nuclear core to adjust the power output of said nuclear core to be equal to turbine load;

adjustable means for generating a predetermined reactor power level setpoint signal above which it is undesirable to inhibit automatic control element motion produced by said automatic motion control means;

means responsive to said coolant vapor relief means for producing a total valve capacity signal proportional to the power level corresponding to the total capacity of said coolant vapor relief valves which are operable automatically to divert coolant vapor;

means responsive to said predetermined reactor power level setpoint signal, said turbine load signal and said total capacity signal for producing a signal commensurate with the lower of said predetermined reactor power level setpoint signal and the sum of said turbine load signal and said total valve capacity signal, said resultant signal being the real reactor power level setpoint signal;

means responsive to said real reactor power level setpoint signal for limiting said signal to values greater than or equal to a predetermined minimum value below which the nuclear power system's control systems become unstable, said limited signal being the final reactor power level setpoint signal;

means responsive to said final reactor power level setpoint signal and said reactor power output signal for producing a motion inhibit signal only when the final reactor power

level setpoint is greater than the reactor power output; and

means responsive to said motion inhibit signal for inhibiting said automatic motion control means from responding to changes in turbine load.

4,046,626

PRESSURIZED-WATER REACTOR EMERGENCY CORE COOLING SYSTEM

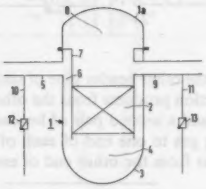
Franz Winkler, and Harald Helf, both of Erlangen, Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Nov. 14, 1974, Ser. No. 523,888

Claims priority, application Germany, Nov. 20, 1973, 2357893

Int. Cl.² G21C *9/00*

U.S. Cl. 176—38 **2 Claims**



1. An emergency core cooling system for a pressurized-water reactor pressure vessel containing a core and forming a lower plenum having an inlet for receiving pressurized-water coolant for upward flow through said core, and an upper plenum receiving said coolant from said core and having an outlet connection for said coolant, said system having a first means for holding a first supply of emergency water under a first pressure and for connecting this first supply through a check valve to said lower plenum, and a second means for holding a second supply of emergency water under pressure and for connecting this second supply through a second check valve to said upper plenum, said pressure of both said means being lower than the pressure of the pressurized-water coolant when said upward flow is adequate to cool said core, said check valves opening in the event said pressure of said coolant drops below said pressure of said means, so that said supplies flow into said plenum, said second means providing a flow of said second supply into said upper plenum, at a greater rate than the flow rate provided by said first means of said first supply into said lower plenur .

4,046,627

NUCLEAR REACTORS

John Ernest Middleton, Knutsford, England, assignor to Nuclear Power Company (Whetstone) Limited, London, England

Filed Apr. 23, 1975, Ser. No. 570,667

Claims priority, application United Kingdom, Apr. 29, 1974, 18619/74

Int. Cl.² G21C *9/00*

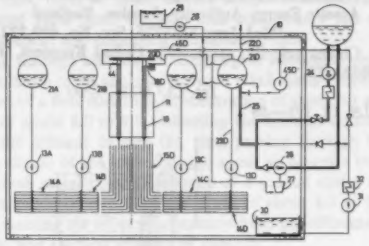
U.S. Cl. 176—38 **12 Claims**

1. A nuclear-reactor cooling-water supply header assembly comprising

a plurality of sub-header pipes extending generally parallel with one another, each having a first end and a second end and, spaced along its length, a plurality of water outlets for connection each to a respective reactor pressure-tube feed pipe,

first and second end pipes connecting the sub-header pipes together at their first and second ends respectively, and

a plurality of header pipes extending transversely across the sub-header pipes and spaced from one another longitudinally thereof, each header pipe having a water inlet, for connection to a water pump, and a plurality of branch



pipes spaced along its length and connecting it each to a respective one of the sub-header pipes.

4,046,628

NUCLEAR REACTORS

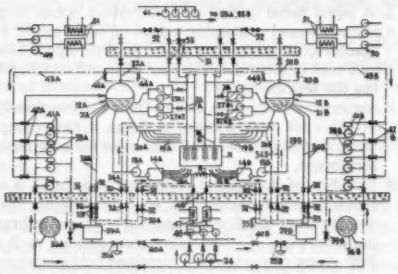
John Ernest Middleton, Knutsford, England, assignor to Nuclear Power Company (Whetstone) Limited, London, England

Filed Oct. 24, 1975, Ser. No. 625,507

Claims priority, application United Kingdom, Oct. 25, 1974, 46267/74

Int. Cl.² G21C *15/00*

U.S. Cl. 176—38 **7 Claims**



1. In a water-cooled nuclear reactor comprising: two coolant circuits each comprising a bottom header, a plurality of vertically-arranged pressure tubes each having nuclear fuel disposed therein and being connected at its lower end to the bottom header to receive therefrom a main flow of coolant water for cooling the fuel, a steam drum connected to the upper ends of the pressure tubes to receive heated coolant water therefrom, main coolant-circulator means arranged for pumping water from the steam drum to the bottom header, and respective further pump means arranged to pump an auxiliary coolant water flow from the steam drum of each coolant circuit directly into the pressure tubes of that circuit in the form of spray cooling in such pressure tubes; means interconnecting the bottom headers of the two coolant circuits; a steam outlet for each steam drum; a water inlet means for each steam drum; main feedwater pumps arranged to supply make-up water to the said water inlet means; and water inlet valves connected between the main feedwater pumps and the said water inlet means, that improvement comprising: means controlling the water inlet valves in dependence on the pressure in the coolant circuits and closing said valves in response to a fall in such pressure; and further connections arranged to supply feedwater directly, in the event of such pressure fall, from the main feedwater pumps to the bottom header of each coolant circuit and into the pressure tubes of each coolant circuit as the said spray cooling therein.

4,046,629

NUCLEAR REACTORS

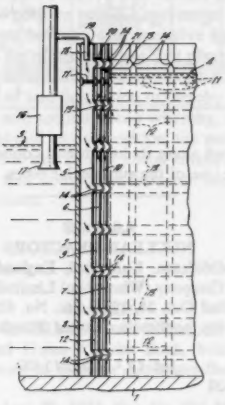
John Graham Durston, Northwich, and John Richard Hind, Warrington, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed June 23, 1976, Ser. No. 699,222

Claims priority, application United Kingdom, July 7, 1975, 28533/75

Int. Cl.[2] G21C 9/00

U.S. Cl. 176—38 2 Claims



1. A liquid metal cooled nuclear reactor comprising,

a primary vessel containing a pool of liquid metal, a nuclear reactor core submerged in the pool of liquid metal,

a core tank immersed in the pool of liquid metal and enclosing the reactor core,

a continuous membrane spaced from the inner wall surface of the core tank thereby defining a first compartment bounded by the inner wall surface of the core tank and the membrane,

a plurality of continuous membranes defining a series of second compartments, the series extending radially inwardly from the first compartment, the membranes having a network of intersecting corrugations, each one of a first group of parallel corrugations being continuous and each one of a second group of parallel corrugations orthogonal to the first group being formed intermittently, the ends of the intermittent sections of the corrugations being profiled to follow the corrugations of the first group, the corrugations of the first group being perforated by slits at the intersections of the corrugations, and

a pump having an inlet port submerged in the pool of liquid metal outside of the core tank and an outlet port disposed for discharging liquid metal into the first compartment whereby liquid metal is able to be flowed from the outlet port sequentially through the chambers by way of the perforations.

4,046,630

PROCESS PLANT

Geoffrey Coast, Northwich, and Ronald Francis Briody, Wigan, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

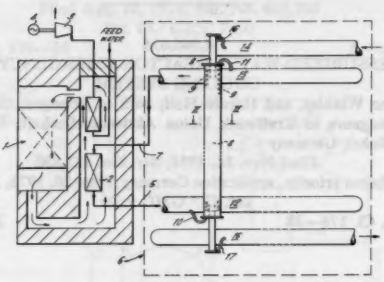
Filed Apr. 26, 1976, Ser. No. 680,227

Claims priority, application United Kingdom, May 15, 1975, 20744/75

Int. Cl.[2] G21D 9/00

U.S. Cl. 176—39 6 Claims

1. A process plant for performing high temperature endothermic reactions with the aid of a distributed catalyst and having a high temperature gas cooled nuclear reactor as a heat source, the plant comprising at least one bank of parallel, unidirectional-flow, process tubes, each tube defining therewithin a reaction zone, conduits for hot gas coaxially surrounding the process tubes to supply heat to the reaction zones, each said conduit being associated with one only of said process tubes, a first pair of header pipes, one header pipe of said first pair connected to supply reactants to one end of each of the



process tubes, the other header pipe of said first pair connected to receive reaction products from the other end of each of the process tubes and a second pair of header pipes connected to supply heating gas to one end of each of the conduits and to receive said gas from the other end of each of the conduits

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4,046,631

PLUGS

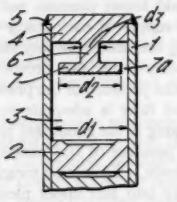
Leslie Clapham, Lytham, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Sept. 10, 1973, Ser. No. 396,106

Claims priority, application United Kingdom, Sept. 15, 1972, 42838/72

Int. Cl.[2] G21C 3/10

U.S. Cl. 176—79 2 Claims



1. A metal nuclear fuel can having a metal closure plug for closing an open end of the can, the plug having a closure portion dimensioned to engage the open end, a team of reduced cross-sectional area extending axially from the dimensioned portion into the can interior, the stem terminating in a flange of enlarged cross-sectional are, the flange being formed of a material which is selectively susceptible of attack by hydrogen, the surface of the flange remote from the closure portion having a surface roughness greater than that of the interior surface of the can wall.

4,046,632

NUCLEAR REACTOR PRESSURE VESSEL, MULTIPLE MEASURING LINE, BUSHING ASSEMBLY

Manfred Puchelt, Buckenhof, and Hartmut Seidelberger, Erlangen, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Apr. 9, 1975, Ser. No. 566,317

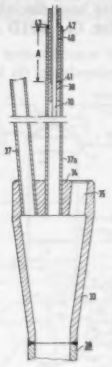
Claims priority, application Germany, Apr. 10, 1974, 2417601

Int. Cl.[2] G21C 17/00

U.S. Cl. 176—87 5 Claims

1. A nuclear reactor pressure vessel having a passage

through which a bundle of individual measuring lines extends, a tubular mounting having an inner end provided with releasable means for releasably connecting it to said vessel with said bundle projecting into the mounting and the mounting having an outer end from which a multiplicity of tubes start and extend to terminal ends with said lines extending individually from the bundle through individual ones of the tubes and beyond their terminal ends, each line being passed through a



sleeve slidably inserted in the tube through which the line extends and the sleeve having an inner portion with a terminal end within the tube and which portion has a soldered joint with the line and the sleeve having an outer portion projecting beyond the tube's terminal end, each tube having a length between the soldered and welded joints long enough to permit welding of the welded joint without melting of the soldered joint.

4,046,633

DIRECT RENIN ASSAY SYSTEM AND METHOD

Hans J. Keutel, Salt Lake City, Utah, assignor to University of Utah, Salt Lake City, Utah

Filed July 1, 1974, Ser. No. 484,472
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R **12 Claims**

1. A substrate having a specificity for the enzymatic action of renin enzyme comprising:
an octopeptide having the general formulation: PRO-PHE-HIS-LEU-LEU-VAL-TYR-SER;
a marker attached at one end of the substrate;
an insoluble carrier attached at the other end of the substrate so as to immobilize the substrate and attached marker.

4,046,634

ASSAY OF ISOENZYMES BY ION EXCHANGE CHROMATOGRAPHY

Donald W. Mercer, 451 Royce Ave., Pittsburgh, Pa. 15216

Continuation-in-part of Ser. No. 473,438, May 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 426,002, Dec. 19, 1973, abandoned. This application Apr. 16, 1976, Ser. No. 677,553
Int. Cl.² G01N *31/04, 31/08, 31/14*
U.S. Cl. 195—103.5 R **11 Claims**

1. A method of determining the presence of isoenzymes of different net electrical charges derived from creatine phosphokinase in a sample of blood serum or tissue extracts, comprising the steps of
a. equilibrating an ion exchange agent of the amine type based on a polysaccharide matrix with an aqueous buffered alkali metal chloride having about 0.1 molar alkali metal chloride at about pH 8.0 to 9.5 so that the net electrical charge characteristics of the ion exchange agent are similar to those of the blood serum sample in undialyzed, unaltered ionic form or the tissue extract sample in undialyzed, unaltered ionic form;
b. passing said sample of blood serum in undialyzed, unaltered ionic form or tissue extract sample in undialyzed, unaltered ionic form through said equilibrated ion exchange agent and collecting the effluent, then
c. passing through said ion exchange agent successive separate volumes of an aqueous buffered alkali metal chloride solution of a first molar ion concentration of about 0.1 and a pH of about 8.0 to 9.5, collecting the effluent separate from the effluent of step (b), then passing through the same column of the ion exchange agent an aqueous buffered alkali metal chloride solution of a second molar ion concentration of about 0.2 and a pH of about 8.0 to 9.5, and collecting the effluent separately from the effluents of step (b) and the first effluent of step (c);
d. assaying each of said separate effluents to determine whether the isoenzymes of creatine phosphokinase are present therein.

4,046,635

METHOD FOR DETECTING ENZYMES CAPABLE OF DIGESTING FIBRINOGEN OR FIBRIN

Leonard Arthur Moroz, Westmount, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Aug. 27, 1975, Ser. No. 608,237
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.7 **10 Claims**

1. A method for detecting and measuring enzymes capable of digesting fibrin and for detecting and measuring activators and inhibitors of enzymes capable of digesting fibrin which comprises:
a. coating at room temperature a water-insoluble polymer test apparatus with a buffered solution of a radioactive tracer labelled enzyme-free human fibrinogen to produce a moist coating;
b. reacting said moist coating with a thrombin solution thereby converting the labelled fibrinogen to labelled fibrin;
c. contacting said coating of radioactively labelled fibrin with a sample of the unknown enzyme or a mixture of a known enzyme capable of digesting fibrin and the unknown enzyme activator or a mixture of a known enzyme capable of digesting fibrin and the unknown enzyme inhibitor;
d. incubating said sample in contact with said coating;
e. washing the test apparatus with a buffered solution and recovering the solution containing the radioactively digested products released by said sample;
f. counting radiation emitted by said digested and released fibrin and comparing said counts with the number of counts from the coated test apparatus prepared in Step (a).

4,046,636

DIAZEPAM ENZYME CONJUGATES

Edwin F. Ullman, Atherton, and Kenneth E. Rubenstein, Menlo Park, both of Calif., assignors to Syva Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 481,022, June 20, 1974, abandoned, which is a division of Ser. No. 304,157, Nov. 6, 1972, Pat. No. 3,852,157, which is a continuation-in-part of Ser. No. 143,609, May 14, 1971, abandoned. This application May 24, 1976, Ser. No. 689,234
Int. Cl.² C07G *7/02*
U.S. Cl. 195—63 **16 Claims**

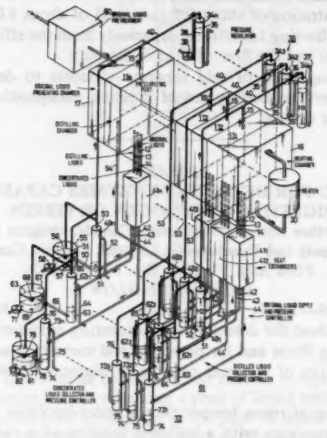
1. An enzyme-bound-benzdiazocycloheptane, wherein said benzdiazocycloheptane is bound to an enzyme at other than its active site and wherein said enzyme retains at least 30% of its original acitivity and has reduced activity when said benzdiazocycloheptane is bound to antibody for said benzdiazocycloheptane.

4,046,637

DISTILLATORY APPARATUS

Shosuke Sasaki, Amagasaki, Japan, assignor to Shosuke Sasaki, Tokyo and Sasaki Takashi, both of, Japan

Filed Mar. 18, 1976, Ser. No. 668,117
Claims priority, application Japan, Mar. 20, 1975, 50-33691
Int. Cl.[2] B01D 3/02
U.S. Cl. 202—174 9 Claims



1. A distillatory apparatus, which comprises:

a plurality of distilling chambers disposed in adjacent relation to one another;

original liquid supplying means coupled to each of said chambers for individually supplying an original liquid to each of said distilling chambers;

distilled liquid draining means coupled to each of said chambers for individually draining out distilled liquids produced in each of said distilling chambers;

concentrated liquid draining means coupled to each of said chambers for individually draining out concentrated liquids remaining in each of said distilling chambers;

pressure retaining means coupled to said chambers for maintaining the atmospheric pressures in said distilling chambers respectively at constant values which gradually decrease one after another; and

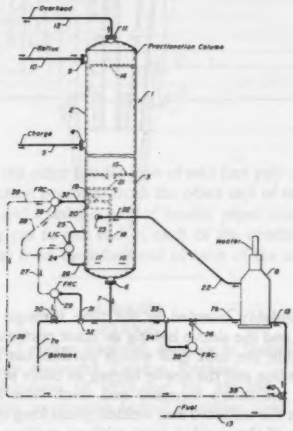
a plurality of heat exchanging devices coupled to said plurality of distilling chambers respectively for effecting heat exchange between the original liquid which is supplied to each of said distilling chambers and the distilled and concentrated liquids which are drained out therefrom, each of said heat exchanging devices comprising at least three plate-shaped passageways formed in layers by disposing in opposing relation a plurality of parallel partition walls extending in the direction of liquid flow, the original liquid flowing in one of said three passageways for supply to the distilling chamber which is associated with said heat exchange device, and the distilled liquid resulting from condensation of vapor generated in said distilling chamber and the concentrated liquid drained from said distilling chamber respectively flowing in the other two of said passageways adjacent to said one passageway in a flow direction opposite to the direction of flow of the original liquid through said one passageway.

4,046,638

METHOD FOR CONTROLLING HEAT INPUT TO THE REBOILER SECTION OF A DISTILLATION COLUMN

R. Gene Fickel, Roselle, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 586,447, June 12, 1975, which is a continuation-in-part of Ser. No. 459,973, April 11, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,570
The portion of the term of this patent subsequent to May 6, 1992, has been disclaimed.
Int. Cl.[2] B01D 3/42
U.S. Cl. 203—1 3 Claims



1. A method for controlling heat input to the reboiler section of a distillation column comprising said reboiler section and a fractionation section, which method comprises the steps of:

a. withdrawing a single liquid bottoms stream from a partially-partitioned reboiler section;

b. regulating the quantity of a portion of said bottoms stream removed from said distillation column as a bottoms product, in response to the level of liquid within said reboiler section;

c. introducing the remaining portion of said bottoms stream into an external reboiler heater;

d. passing the heated, mixed-phase bottoms stream into a substantially liquid-free area of said partially-partitioned reboiler section and therein disengaging liquid from said heated mixed-phase;

e. measuring, within said liquid-free area, the quantity of vapor which passes from the partially-partitioned reboiler section into the fractionation section of said distillation column; and,

f. regulating the fuel input to said external reboiler heater in response to a signal representative of the measured quantity of vapor passing into said fractionation section.

4,046,639

POWER GENERATION AND POTABLE WATER RECOVERY FROM SALINOUS WATER

Don B. Carson, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 22, 1976, Ser. No. 744,065
Int. Cl.[2] B01D 3/06
U.S. Cl. 203—11 10 Claims

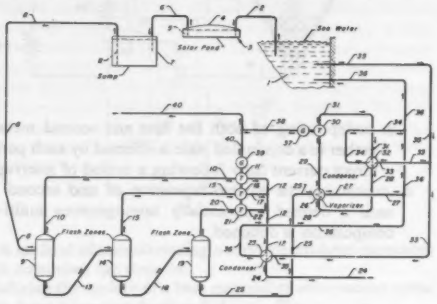
1. A process for the simultaneous generation of power and the recovery of potable water from a source of salinous water which comprises the sequential steps of:

a. introducing a first salinous water portion, obtained from a first depth proximate to the surface of said source, into a solar radiation heat sink;

b. exposing said first salinous water portion, within said solar radiation heat sink, to radiant solar energy for a time sufficient to raise the temperature thereof to a level of at least about 135° F.;

c. introducing the thus-heated salinous water into a plurality of vacuum flash separation zones, each succeeding one of which is maintained at a lower subatmospheric pressure than the preceding zone, (i) to provide substantially non-salinous vaporous phases equal in number to the number of flash separation zones, and (ii) wherein the salinous liquid phase is introduced in series through the plurality of zones;

d. passing each of said non-salinous vapor phases through a separate turbine and (i) condensing the exit vapors via



indirect heat-exchange with a second salinous water portion, obtained from a second depth substantially below the surface of said source, to recover liquid potable water, and, (ii) generating power from the resulting motion of said turbines;

e. vaporizing a hydrocarbon, via indirect heat-exchange with the salinous liquid phase emanating from the last flash zone in said plurality, and (i) passing the resulting vaporized hydrocarbon through a turbine, (ii) condensing the exit hydrocarbon vapors, via indirect heat-exchange with said second salinous water portion and, (iii) re-vaporizing the resulting condensed hydrocarbon; and,

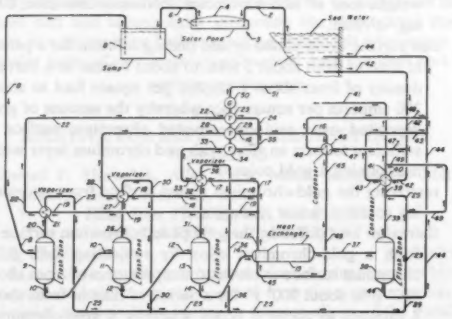
f. generating additional power from the turbine through which said hydrocarbon vapors are passed.

4,046,640

POWER GENERATION AND POTABLE WATER RECOVERY FROM SALINOUS WATER

Don B. Carson, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 22, 1976, Ser. No. 744,064
Int. Cl.² B01D 3/06
U.S. Cl. 203—11 **10 Claims**



1. A process for the simultaneous generation of power and the recovery of potable water from a source of salinous water which comprises the sequential steps of:

a. introducing a first salinous water portion, obtained from a first depth proximate to the surface of said source, into a solar radiation heat sink;

b. exposing said first salinous water portion, within said solar radiation heat sink, to radiant solar energy for a time sufficient to raise the temperature thereof to a level of at least about 135° F.;

c. introducing the thus-heated salinous water into a plurality of vacuum flash separation zones, each succeeding one of which is maintained at a lower subatmospheric pressure than the preceding zone, (i) to produce substantially non-salinous vaporous phases equal in number to the number of flash separation zones and, (ii) wherein the salinous liquid phase is introduced in series through the plurality of zones;

d. vaporizing a hydrocarbon via indirect contact with each of said non-salinous vaporous phases, in separate vaporizers, and (i) passing each of the resulting vaporized hydrocarbon streams through a separate turbine, (ii) condensing the exiting hydrocarbon vapors via indirect heat-exchange with a second salinous water portion, obtained from a second depth substantially below the surface of said source, (iii) generating power from the resulting motion of said turbines and, (iv) re-vaporizing the resulting condensed hydrocarbon;

e. condensing said non-salinous vaporous phases, following vaporization of said hydrocarbons, to recover liquid potable water;

f. introducing the salinous liquid phase emanating from the last flash separation zone in said plurality into a separate vacuum flash zone, maintained at an absolute pressure less than that of the last flash zone in said plurality; and,

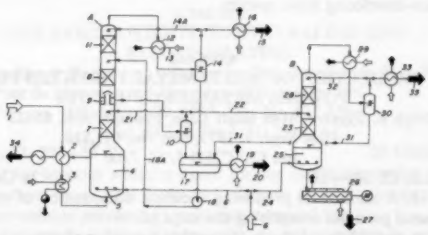
g. condensing the resulting non-salinous vaporous phase, via indirect heat-exchange with said second salinous water portion, and recovering additional liquid potable water.

4,046,641

PROCESS AND APPARATUS FOR THE SEPARATION OF CRUDE BENZOL AND NAPHTHALENE FROM WASHING OIL

Hansjürgen Ullrich, Bochum-Wattenscheid, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Mar. 12, 1975, Ser. No. 557,829
Claims priority, application Germany, Mar. 19, 1974, 2413029
Int. Cl.² B01D 3/16
U.S. Cl. 203—39 **3 Claims**



1. In a process to regenerate washing oil which has been spent during the recovery of naphthalene and benzene from coke oven gas and wherein said spent washing oil is then stripped of volatile constituents with steam to thereby enable resolving the volatile constituents into a number of fractions, said process comprising:

treating a vapor mixture consisting essentially of steam and volatile hydrocarbons, formed as the products of passing steam through said washing oil, by feeding said mixture into the lowermost one of a succession of at least two

superimposed and serially-connected exchange in columns in vapor flow communications,

refluxing the first of said serially-connected exchange columns with a mixture of toluene, xylene and naphthalene,

feeding the second of said serially-connected exchange columns with water as the reflux,

recovering an overhead product from the uppermost exchange column of said succession of at least two exchange columns,

condensing said overhead product,

separating said condensed overhead product in a first phase separator into an essentially water-free benzene fraction and a water fraction,

collecting the resulting liquid mixture from the lower portion of the second of said serially-connected exchange columns, and

separating said resulting liquid mixture in a second phase separator into an essentially water-free toluene-xylene-naphthalene phase and a water fraction.

4,046,642
METHOD OF MAKING ELECTRIC STORAGE BATTERIES

William Howard Edwards, Bolton, England, assignor to Chloride Group Limited, London, England

Filed Sept. 10, 1976, Ser. No. 722,123

Claims priority, application United Kingdom, Sept. 11, 1975, 37405/75

Int. Cl.² H01M *10/44*

U.S. Cl. 204—2.1 **9 Claims**

1. A method of making a Plante lead acid cell which comprises electrolyte formation of the positive plate in a sulphuric acid solution characterised in that the positives in electrolytically unformed or only partially formed condition are assembled with negative plates and separators into the battery container, the container filled with sulphuric acid electrolyte and an amount of a corroding agent selected from the group consisting of nitric acid and nitrates having a powerful corrosive action on lead under anodic conditions and reducible under the final cathodic condition at the corresponding negative plate to ionic species which do not interfere with the cell reactions, is incorporated into the cell, such as to convert the lead surface to an extended surface area and provide a sufficient mass of lead dioxide at the extended surface, and subjecting the positive plates to anodic conditions so as to convert the lead surface to an extended surface area and provide a sufficient mass of lead dioxide at the said extended surface, the treatment being for a time sufficient under the cathodic conditions at the negative plates, to convert all of the said corroding agent to the non-interfering ionic species.

4,046,643
PRODUCTION OF MULTI-METAL PARTICLES FOR POWDER METALLURGY ALLOYS

Ralph E. Rippere, 4145 Banff Lane, Phoenix, Ark. 85023

Filed Sept. 9, 1975, Ser. No. 611,810

Int. Cl.² C25D *5/18, 7/00*

U.S. Cl. 204—10 **24 Claims**

1. A method of producing a diffuse composition of multi-metal particles comprising the steps of:

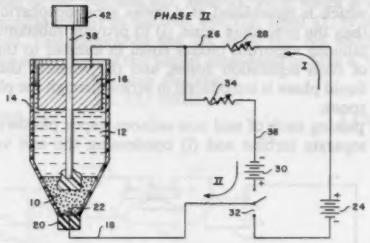
a. providing a cathode comprising a powder of at least a first metal, said powder having a relatively low apparent density of less than approximately 22% of the maximum theoretical density of said first metal;

b. electro-depositing a second metal onto said cathode from an electrolytic composition containing ions of said second metal by imposing direct electrical current on the electrolytic composition;

c. periodically interrupting the flow of direct electrical current, the period of direct current flow being of greater ampere second duration than the period of interruption, wherein

1. deplating of both the first and second metals is effected during each period of interruption,

2. comingling in solution of ions of both the first and second metals is effected by said deplating, and



3. codepositing of both the first and second metals together in a comingled state is effected by each period of direct current flow following a period of interruption;

d. continuing the electro-deposition of said second metal until a desired substantially homogeneous multi-metal composition is obtained.

4,046,644
PROCESS FOR FORMING A GOLD-CHROMIUM ALLOY FROM AN ELECTRODEPOSITED GOLD-CHROMIUM SURFACE

John Joseph Liska, Fords, N.J., assignor to American Standard Inc., New York, N.Y.

Filed May 24, 1976, Ser. No. 689,433

Int. Cl.² C25D *5/10, 5/24, 5/50*

U.S. Cl. 204—37 R **13 Claims**

1. A process for the heat diffusion of an electro-deposited gold layer on a chromium surface to form abrasion resistance gold-chromium alloy consisting essentially of

simultaneously depassivating and cathodically gold plating the chromium surface in an aqueous acid gold plating solution having a gold content of about 0.2 to 2 tr. ozs. per gal, a pH of less than 2 and maintaining said gold solution at about room temperature to about 120° F. whereby the weight loss of said chromium surface is less than 0.01 mg/in²/min;

said surface being plated in said plating solution for a period of time of from about 5 secs. to about 5 mins. at a current density of from about 1 ampere per square foot to about 200 amperes per square foot whereby the amount of gold deposited over said depassivated chromium surface is sufficient to form an alloy with said chromium layer while maintaining a gold color;

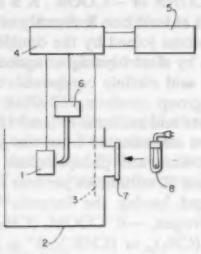
removing the gold-chromium plated surface from said plating solution, water rinsing; and

thereafter heat diffusing the gold plated chromium surface to form a gold-chromium alloy by subjecting said gold-chromium surface to elevated temperatures of from about 650° F to about 900° F. for a period of time of from about 2 minutes to about 6 hours whereby a gold-chromium alloy surface is produced which has a hardness and is more abrasion resistant than the same gold coating which has not been heat diffused.

4,046,645
METHOD OF MANUFACTURING SOLID ELECTROLYTIC CAPACITOR

Akihiko Yoshida, Sakai, and Atsushi Nishino, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed June 4, 1976, Ser. No. 692,945
Claims priority, application Japan, June 6, 1975, 50-68886
Int. Cl.² C25D 9/06; H01G 9/24
U.S. Cl. 204—37 R **9 Claims**



1. A method of manufacturing a solid electrolytic capacitor, which comprises the steps of:

anodizing the surface of a base material of valve action metal to form a semiconductive dielectric film;

electrodepositing a semiconductive metal oxide on said dielectric film by electrolytically oxidizing an electrolyte comprising a metallic salt solution at a temperature above 70° C, with said dielectric film being used as an anode and being irradiated with radiation, the energy of which is high enough to allow valence electrons of the dielectric film to enter the conduction band,

subjecting said metal oxide film to heat treatment at above 110° C; and

forming a cathode layer on said metal oxide film.

4,046,646
METHOD OF GALVANIZING STEEL PARTS

Heinrich Warnke, Marienfeld, and Friedel Kaup, Gutersloh, both of Germany, assignors to Miele & Cie, Gutersloh, Germany

Continuation-in-part of Ser. No. 502,415, Sept. 3, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,456
Claims priority, application Germany, Sept. 4, 1973, 2344434
Int. Cl.² C25D 5/36
U.S. Cl. 204—38 B **19 Claims**

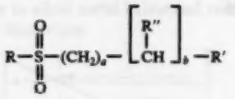
1. A method for coating a steel part comprising introducing the steel part into an activation solution which contains a metal salt which is nobler in potential than iron to non-electrolytically deposit a layer of the nobler metal on the surface of the steel part and subsequently immersing the thus-coated steel part in a galvanizing bath containing a zinc salt whereupon a similar layer of zinc is electrogalvanized onto the steel part.

4,046,647
ADDITIVE FOR IMPROVED ELECTROPLATING PROCESS

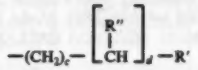
Edward P. Harbulak, Allen Park, Mich., assignor to M&T Chemicals Inc., Greenwich, Conn.

Filed June 17, 1976, Ser. No. 697,033
Int. Cl.² C25D 3/12, 3/20, 3/56
U.S. Cl. 204—43 T **26 Claims**

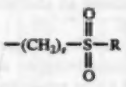
1. A process for the preparation of an electrodeposit which contains; at least one metal selected from the group consisting of nickel and cobalt or; binary or ternary alloys of the metals selected from nickel, iron, and cobalt; which comprises passing current from an anode to a cathode through an aqueous acidic electroplating solution containing at least one member selected from the group consisting of nickel compounds and cobalt compounds and iron compounds providing nickel, cobalt and iron ions for electrodepositing nickel, cobalt, nickel-cobalt alloys, nickel-iron alloys, cobalt-iron alloys or nickel-iron-cobalt alloys; the improvement comprising the presence of 5×10^{-6} moles per liter to 0.5 moles per liter of a β-substituted, γ-substituted, or β,γ-disubstituted sulfone exhibiting the following generalized structural formula:



wherein R represents alkyl, alkenyl, alkynyl, aryl, alkaryl, or aralkyl, or the group



R′ represents hydrogen, R, or the group



R″ represents —OH, —SO_3H or salt thereof, or —COOH or salts or esters thereof;

a, b, c, d, e, are independently integers 1 or 2; except when R″ is —COOH "*a*" may be zero;

for a time period sufficient to form a metal electroplate upon said cathode.

4,046,648
POLYAMINE ADDITIVES IN ALKALINE ZINC ELECTROPLATING

John Derek Rushmere, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 29, 1975, Ser. No. 617,539
Int. Cl.² C25D 3/22, 3/24
U.S. Cl. 204—55 R **25 Claims**

1. An aqueous addition agent for the electrodeposition of zinc from an alkaline bath, said addition agent comprising a water-soluble polyamine brightener prepared by

condensing an alkanolamine with an epihalohydrin in proportions of at least about 2 moles of epihalohydrin per mole of alkanolamine to produce a condensation product which is essentially completely water-soluble and free from epihalohydrin, and

reacting said condensation product with at least 0.3 mole of ammonia or an amine other than an alkanolamine per mole of alkanolamine until the total ionic halogen is at least about 1 mole per mole of alkanolamine.

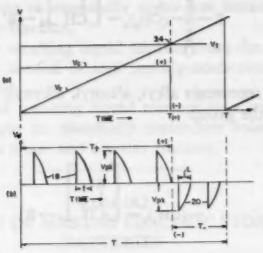
14. An aqueous alkaline bath for the electrodeposition of zinc comprising a source of zinc ions and from about 0.1 g/l to the solubility limit of a polyamine brightener of claim **1.**

4,046,649

FORWARD-REVERSE PULSE CYCLING ANODIZING AND ELECTROPLATING PROCESS

Richard A. Elco, Pittsburgh; James A. Bauer, Murrysville, both of Pa., and Willard E. Treese, Walnut Creek, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 497,174, Aug. 13, 1974, Pat. No. 3,975,254. This application Mar. 30, 1976, Ser. No. 671,855
Int. Cl.² C25D 11/04
U.S. Cl. 204—58 2 Claims



1. A process of anodizing an aluminum-copper alloy metal comprising the steps of:

applying a first series of discrete partial sinusoidal positive pulses to the aluminum-copper alloy metal part in the anodizing bath for a first predetermined time; and

applying a second series of discrete partial sinusoidal negative pulses sequentially after said first series of positive pulses are completed for a time less than said first predetermined length of time.

4,046,650

CARBON BLOCK FOR CATHODES OF ALUMINUM

Kazuhiko Hirasawa, Nagoya, and Yasuo Okamoto, Okayama, both of Japan, assignors to Sumitomo Aluminum Smelting Co., Ltd. and Kyowa Carbon Company, Limited, both of Osaka, Japan

Continuation of Ser. No. 123,469, April 29, 1975, abandoned. This application Apr. 29, 1975, Ser. No. 572,767
Claims priority, application Japan, Mar. 16, 1970, 45-22397
Int. Cl.² C25C 1/02, 7/02
U.S. Cl. 204—67 2 Claims

1. In an electrolytic process for producing aluminum which comprises dissolving alumina in a molten salt bath containing cryolite at an elevated temperature in an electrolytic cell and electrolyzing said alumina by passing a direct current through the molten salt bath through a carbon anode to a carbon cathode constructed by lining baked carbon blocks on the bottom of the electrolytic cell to deposit aluminum on the bottom of the electrolytic cell, the improvement which comprises prolonging the life of the electrolytic cell by constructing said cathode of at least one carbon block having a stability constant of 0.7–1.0, said block consisting of at least 50% by weight of petroleum coke and less than 50% by weight of at least one other carbonaceous material selected from the group consisting of calcined anthracite, cokes other than petroleum coke, and other graphitized carbonaceous materials, based on the weight of a dry aggregate of the coke and said other materials, which has been kneaded with pitch, formed and baked at a temperature higher than 2000° C but lower than about 2400° C to yield said carbon block.

4,046,651

ELECTROLYTIC HYDRODIMERIZATION PROCESS IMPROVEMENT

Joseph C. Burnett, Jr.; John J. Hicks, and Leonard L. Hovey, all of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed July 28, 1975, Ser. No. 599,908
Int. Cl.² C25B 3/10
U.S. Cl. 204—73 R 10 Claims

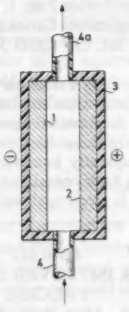
1. In a process for hydrodimerizing in an undivided cell an olefinic compound having a formula $R_2C{=}CR{-}X$ wherein —X is —CN, —CONR or —COOR', R is hydrogen or R', R' is C_1–C_4 alkyl and at least one R directly attached to either of the two carbon atoms joined by the double bond in said formula is hydrogen by electrolyzing an aqueous solution having dissolved therein said olefinic compound, conductive salt selected from the group consisting of alkali metal phosphates, borates, carbonates and sulfates, at least 10^{-3} gram mole per liter of a directive salt selected from the group consisting of quaternary ammonium and phosphonium ions and between about 0.1 and about 50 millimoles per liter of a nitrilocarboxylic acid compound having the formula $Y_2N(Z)_nR''COOM$ wherein Y is hydrogen, —R''COOM, $(CH_2)_{m+1}OH$ or C_1–C_{20} alkyl; —R''— is $(CH_2)_m$ or (CHR'); R'' is hydroxy, 'COOM, $(CH_2)_mCOOM$ or C_1–C_8 alkyl, hydroxyalkyl or hydroxyphenyl; Z is a divalent C_2–C_6 hydrocarbon radical; M is hydrogen, alkali metal or ammonium, m is 1 or 2; n is an integer from 0 to 4 and at least one Y is —R''COOM or $(CH_2)_{m+1}OH$ in contact with a cathodic surface having a cathode potential sufficient for hydrodimerization of said olefinic compound, the improvement which comprises including in said solution between 0.1 and about 50 millimoles per liter of a tri(C_2–C_4 alkanol)amine.

4,046,652

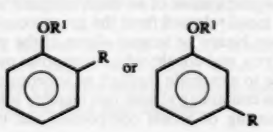
PROCESS FOR PREPARING P-BENZOQUINONE DIKETALS

Rudolf Pistorius, Benniehausen, and Hans Millauer, Eschborn, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 19, 1975, Ser. No. 642,397
Claims priority, application Germany, Dec. 21, 1974, 2460754
Int. Cl.² C25B 3/02
U.S. Cl. 204—78 12 Claims



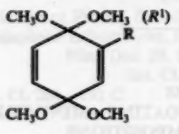
1. A process for electrochemically preparing p-benzoquinone ketals which comprises anodically oxidizing benzene per se or an alkoxybenzene of the formula



wherein R is hydrogen, an alkyl group having from 1 to 4 carbon atoms or halogen and R^1 is an alkyl group having from 1 to 4 carbon atoms, in an electrolyte which is a methanolic solution containing no more than about 5% by weight of water and about 0.2 to 15% by weight, calculated on the electrolyte, of a conductivity improving salt selected from ammonium and alkali metal fluorides, perchlorates, nitrates, tetrafluoroborates, hexafluorosilicates, hexafluorophosphates, benzene sulfonates, p-toluene sulfonates and quaternary ammonium and phosphonium salts of the formula

$$A_xB_{4-x}Z^+Y^-$$

wherein A represents identical or different alkyl radicals,
B represents C_6H_5,
x represents an integer of from 1 to 4,
Z represents N or P and
Y represents F or SO_4CH_3
as well as mixtures of such salts at a pH of more than 7, at an anode of a material selected from graphite, metals of the platinum group, alloys thereof and PbO_2, at a temperature of from about $-20°$ to $+60°$ C, to obtain a p-benzoquinone tetramethyl ketal of the formula



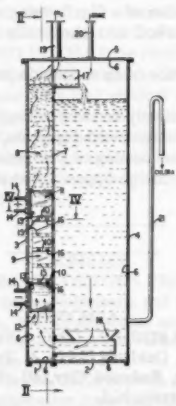
wherein R and R^1 have the meaning given above.

4,046,653

NOVEL ELECTROLYSIS METHOD AND APPARATUS

Oronzio de Nora; Vittorio de Nora, and Placido M. Spaziante, all of Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed May 27, 1975, Ser. No. 580,952
Claims priority, application Italy, Feb. 20, 1975, 20464/75
Int. Cl.[2] C25B *1/24*
U.S. Cl. 204—95 7 Claims



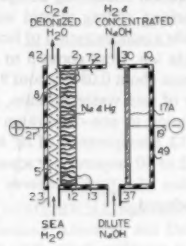
1. A process for the preparation of an alkali metal halate by electrolysis of an aqueous alkali metal halide solution comprising passing an alkali metal halide solution utilizing a sustained gas-lift effect of evolved hydrogen gas, upwardly through a vertically enlongated housing, a plurality of vertically stacked bipolar electrolysis units occupying substantially the entire cross-sectional area of the housing with vertical anodes and cathodes interleaved to provide a vertical honeycomb effect and to avoid recirculation of the electrolyte inside the compartment while passing an electrolysis current therethrough at a temperature of 90° to 100° C and at a electrolysis current to volume ratio of 15 to 30 A/liter to convert at least a portion of the alkali metal halide to alkali metal hypohalite and to alkali metal halate, providing for very low hydraulic pressure drop along the entire vertical path of the electrolyte, passing the resulting electrolyte, while venting the hydrogen formed, to a reaction zone whose volume is sufficient to provide a residence time to substantially complete the conversion of the alkali metal hypohalite to alkali metal halate and recovering the said halate from the electrolyte.

4,046,654

PROCESS FOR DESALINATION WITH CHLOR-ALKALI PRODUCTION IN A MERCURY DIAPHRAGM CELL

Marc Cole, 1057 C Argyll Circle, Lakewood, N.J. 08701

Filed Apr. 6, 1976, Ser. No. 674,288
Int. Cl.[2] C25B *1/26, 1/20, 13/08, 1/02*
U.S. Cl. 204—99 17 Claims



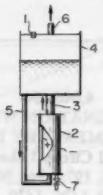
1. A novel process for the production of deionized water, alkali metal hydroxide, halogen, and hydrogen from an anolyte comprising an aqueous saline solution the solutes of which comprise alkali metal halides, said halides being selected from the group consisting of chloride and bromide, said anolyte being continuously influent to the anodic compartment of an electrolytic cell, said process being characterized by two alternating phases, a first of said phases comprising the electrosorption of anions in said anolyte on the surface of a porous anode immersed in said anolyte, said anode being impressed with a voltage lower than the discharge D.C. voltage for said anions, said voltage activating transmission of cations in said anolyte from said anodic compartment thru a cation-permeable diaphragm structure separating said anodic compartment from a cathodic compartment of said cell, said cations being then transmitted by said impressed voltage thru a catholyte comprised of an aqueous alkali metal hydroxide solution continuously circulated thru said cathodic compartment, said anolyte and said catholyte being separately maintained, said cations being then electrosorbed on the surface of a porous cathode immersed in said catholyte, said cathode being impressed by a lower than discharge D.C. voltage for said cations, the so formed at least partly deionized water being effluent from said anodic compartment during said first phase of said process, and a second of said alternating phases comprising the raising of the D.C. voltage of both said anode and said cathode to or above the voltage necessary for electrical discharge of the said electrosorbed anions and cations respectively, the so formed halogen being effluent with said anolyte and the so formed alkali metal hydroxide and hydrogen being effluent with said catholyte during said second phase, and finally the voltage of both said anode and said cathode being lowered as specified above for said first phase as part of an alternation to said first phase of said novel process.

4,046,655

PROCESS FOR ELECTROLYTICALLY PURIFYING A PHOTOGRAPHIC DEVELOPER WASTE SOLUTION

Reiichi Itai, and Katsuyuki Murakami, both of Maebashi, Japan, assignors to The Japan Carlit Company, Ltd., Tokyo, Japan

Filed Feb. 18, 1975, Ser. No. 550,228
Claims priority, application Japan, Feb. 21, 1974, 49-19996
Int. Cl.[2] C02C *5/04, 5/12*
U.S. Cl. 204—149 9 Claims



1. A process for electrolytically purifying a photographic developer waste solution containing components having high COD values comprising adding to said waste solution three precursors to provide a concentration of from about 3 to about 60 grams of chloride ion, from about 3 to about 25 grams of bromide ion, and from about 0.08 to about 9 grams of iodide or iodate ion per liter of said waste solution, and subjecting the resulting waste solution to non-diaphragm electrolytic oxidation at a pH of 2 to 12, a temperature of 10° to 100° C., an anode current density of 2 to 40 amperes per square decimeter and a current concentration of 3 to 50 amperes per liter until said COD values are reduced.

4,046,656

PHOTOCHLORINATION PROCESS FOR METHYL AROMATIC COMPOUNDS

Ralph A. Davis, and R. Garth Pews, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 6, 1976, Ser. No. 747,859
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—158 HA 15 Claims

1. A process for the photochlorination of a methyl aromatic reactant to form an α-chloro-substituted aromatic product, in which process each benzylic hydrogen of the reactant is replaced by a chlorine atom, comprising contacting said reactant with chlorine in the presence of ultraviolet radiation and an accelerating amount of bromine.

4,046,657

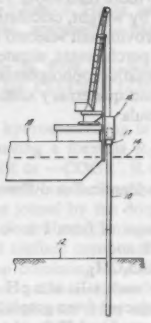
APPARATUS AND METHOD OF ASSISTING PILE DRIVING BY ELECTRO-OSMOSIS

Phillip Andrew Abbott, 1430 Fountainview Drive, No. 310, Houston, Tex. 77057

Filed May 5, 1976, Ser. No. 683,564
Int. Cl.[2] B01D *13/02;* E02D *7/26*
U.S. Cl. 204—180 R 10 Claims

1. A method of assisting the driving of a hollow pile into soil containing water comprising,

when the pile is in contact with the soil, directing a direct current downwardly through the soil on the inside of the pile, out the bottom of the pile, and up the outside of the pile whereby water on the inside of the pile will move out



and up the outside of the pile making the pile easier to drive through the soil.

4,046,658

PROCESS FOR ELECTROCOATING AMINIMIDE CONTAINING COMPOSITIONS

William B. Brown, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 15, 1975, Ser. No. 604,950
Int. Cl.[2] C25D *13/06*
U.S. Cl. 204—181 4 Claims

1. A method of electrophoretically depositing a continuous resin coating on an electrode comprising the steps of:

A. forming a stable dispersion comprising water and electrically charged resin particles having an average diameter of from 1 to 10 microns, and wherein the pH of said aqueous dispersing medium is maintained at least about 2 units from the neutral value of 7 by the presence of compatible organic acids or bases, said resin comprising:

a. a major portion of a film forming addition polymer or mixtures thereof, and chemically bonded at random thereto;

b. a minor portion of an aminimide pendent functionality, and

B. applying a relatively constant voltage through electrodes in direct contact with said dispersion, and thereby depositiong continuous coating of said resin onto the electrode which has the charge opposite that of the charge on the particles.

4,046,659

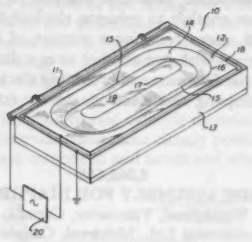
METHOD FOR COATING A SUBSTRATE

Robert L. Cormia, Oakland; Terry A. Trumbly, Orinda, and Sigurd Andresen, Redwood City, all of Calif., assignors to Airco, Inc., Montvale, N.J.

Continuation-in-part of Ser. No. 469,004, May 10, 1974, abandoned. This application Jan. 10, 1975, Ser. No. 540,044
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—192 C 8 Claims

1. In a method for coating a substrate in a process in which an insulating layer is formed on one portion of a conductive target, and a second portion of the target is kept free of the insulating layer by ionic bombardment, the improvement comprising:

applying an alternating electric potential to the target of a frequency greater than 400 Hz and sufficiently high to



substantially eliminate the formation of arcs but less than 60,000 Hz.

4,046,660

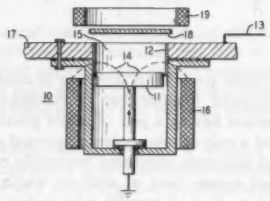
SPUTTER COATING WITH CHARGED PARTICLE FLUX CONTROL

David Bruce Fraser, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 645,087

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 C **6 Claims**



1. Method for the sputter deposition of a layer on a substrate comprising placing the substrate in the particle beam of a magnetic field aided sputtering source, which said substrate is situated in the residual magnetic field of the sputtering source CHARACTERIZED IN THAT the residual magnetic field is reduced by means of a second magnetic field of the same order of intensity or greater than said residual magnetic field, and, corresponding in geometry to said residual magnetic field, whereby the flux of charged particles incident on the substrate is reduced said second magnetic field being produced by an auxiliary magnet means situated below the plane of said substrate, opposite said source.

4,046,661

CERAMIC OXYGEN PROBE

Robert Kenneth Stringer, Heidelberg, and Kenneth Alan Johnston, Elsternwick, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

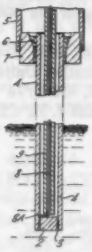
Filed Apr. 14, 1972, Ser. No. 243,930

Claims priority, application Australia, Apr. 14, 1971, 4587/71

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 S **3 Claims**

1. A probe for use in measuring the oxygen concentration of fluids comprising: a ceramic tube constructed of alumina, mullite, or an aluminous porcelain containing at least 56% by weight alumina and in which at least 7% of the alumina content is free alumina and not more than 40% by weight silica; a pellet of solid electrolyte located in said ceramic tube in proximity to the end of said ceramic tube, and sealed to the tube by a fusion weld, the outer diameter of said pellet being substantially the same as the inner diameter of said tube; a eutectic



mixture at the electrolyte/tube interface; and an electrode within said tube contacting the inner face of said pellet.

4,046,662

ELECTRO-CHEMICAL MACHINE TOOLS

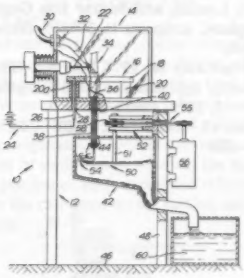
Charles Stanley Gardner, Allestree, and Denis Edward Molloy, Mickleover, both of England, assignors to Rolls-Royce (1971) Limited, London, England

Filed Oct. 31, 1975, Ser. No. 627,787

Claims priority, application United Kingdom, Nov. 6, 1974, 47905/74

Int. Cl.² C25F *3/02, 7/00*

U.S. Cl. 204—275 **2 Claims**



1. An electrolyte draining apparatus comprising:

an electrolyte collecting vessel;

an electrochemical machine tool worktable;

an electrolyte drainage conduit connectable between said electrochemical machine tool worktable and said electrolyte collecting vessel;

a rotary member positioned within said collecting vessel, said rotary member receiving a flow of electrolyte from said conduit; and

means for rotating said rotary member at a speed sufficient to throw off said electrolyte therefrom in the form of droplets so dispersed as to prevent conduction of electricity therebetween, said dispersed electrolytic droplets being rejoined in said collector vessel.

4,046,663

CARBON FIBER ELECTRODE

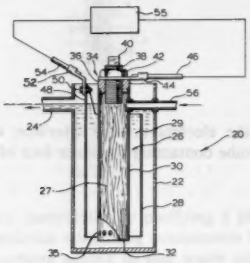
Bernard Fleet, London, and Sankar Das Gupta, New Malden, both of England, assignors to 308489 Ontario Limited, Toronto, Canada

Filed July 28, 1975, Ser. No. 599,457

Claims priority, application United Kingdom, Aug. 7, 1974, 34770/74; Nov. 15, 1974, 49533/74

Int. Cl.[2] C02B *1/82;* C25B *9/00, 9/02*

U.S. Cl. 204—280 3 Claims



1. A flow-through electrode for use in an electrochemical reactor, the electrode comprising:

means providing for electrical connection to the electrode;

a housing having a preferred length;

a plurality of individual carbon fibers arranged contiguously in the housing and each of the carbon fibers having a length at least equal to said preferred length and having an end coupled to the electrical connection means for electrical continuity between said means and the carbon fibers; and

said carbon fibers being sufficiently numerous to effectively fill the housing, the housing having an inlet and an outlet to direct a forced flow of electrolyte between the carbon fibers in the housing for better electrochemical efficiency.

4,046,664

METALLIC FILAMENT ELECTRODE

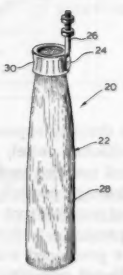
Bernard Fleet, London, and Sankar Das Gupta, New Malden, both of England, assignors to 308489 Ontario Limited, Toronto, Canada

Filed July 28, 1975, Ser. No. 599,458

Claims priority, application United Kingdom, Aug. 7, 1974, 34770/74; Nov. 5, 1974, 49533/74

Int. Cl.[2] C02B *1/82;* C25B *9/00, 9/02*

U.S. Cl. 204—280 2 Claims



1. An electrode for use in an electrochemical reactor the electrode comprising: a plurality of electrically conductive metallic filaments each of the filaments having a very small maximum thickness compared with the length of the filament and having a relatively good electrical conductivity, the filaments exhibiting little resistance to transverse deflection and being arranged in side by side relationship so that as electrolyte flows generally longitudinally over the filaments flow eddys will cause continuous transverse movements of the filaments relative to one another to enhance electrolytic action at the electrode and means retaining a portion of the filaments in electrical contact with one another over a discrete portion of the length of the filaments and providing electrical connection means for coupling the electrode to an external electrical circuit.

4,046,665

ELECTRODE ASSEMBLY FOR DIAPHRAGM CELLS

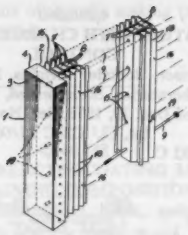
Gothe Oscar Westerlund, Vancouver, Canada, assignor to Chemetics International Ltd., Montreal, Canada

Filed Dec. 15, 1976, Ser. No. 750,887

Claims priority, application Canada, Jan. 7, 1976, 243239

Int. Cl.[2] C25B *13/02;* C25C *7/04;* C25B *9/00*

U.S. Cl. 204—282 4 Claims



1. An electrode assembly comprising in combination:

A. an elongated titanium bar of rectangular transversal cross-section having a pair of major planar opposed surfaces and a pair of minor planar opposed surfaces;

B. a finned electrode consisting essentially of a plurality of elongated spacer bars of uniform width and thickness mounted in stacked parallel relationship on one of said major planar surfaces and a plurality of elements maintained in spaced parallel relationship throughout their length by said spacers, each element having a bottom flat wall of a width not less than that of the spacers and a pair of spaced outwardly sloping sidewalls each including an outwardly extending ledge; said spacers and elements being made of a metal selected from iron, copper, cobalt, nickel and alloys of these metals; and

C. enveloping the finned electrode, a prefabricated diaphragm having uniformly spaced corrugations of a wave length equal to the distance between two adjacent ledges, said diaphragm being so positioned on the electrode that each ledge has its longitudinal edge in contact therewith at the bottom of a corrugation.

4,046,666

DEVICE FOR PROVIDING HIGH-INTENSITY ION OR ELECTRON BEAM

Edwin D. McClanahan, and Ronald W. Moss, both of Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

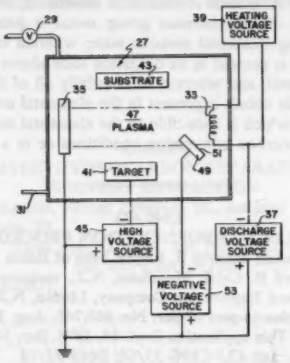
Filed May 7, 1976, Ser. No. 684,418

Int. Cl.[2] C23C *15/00;* H01J *19/04*

U.S. Cl. 204—298 10 Claims

1. In a device for producing an ion beam including a gas-tight chamber with means for providing ionizable, inert gas at near vacuum pressures within said chamber, said chamber containing a cathode comprising a heat-resistant material and having an outer electron emissive surface adapted for thermionic emission; an anode spaced apart from said cathode; said anode and cathode interconnected with a source of sufficient

voltage to establish an ionized gas plasma between said electron emissive surface of said cathode and said anode; the improvement wherein an auxiliary electrode is disposed with at least one surface exposed to and facing electron emissive surface of said cathode and positioned so as to be exposed to said ionized gas plasma, said at least one surface of the auxiliary electrode containing a low-work-function material which when dispersed within the electron emissive surface of said cathode material provides a thermionic work function lower than the work function of said cathode material, said cathode and auxiliary electrode being more closely positioned than the positioning of said cathode to said anode and wherein there are



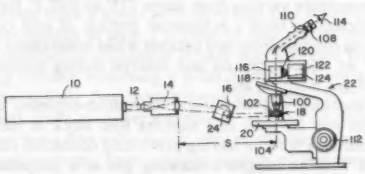
provided electrical means for maintaining said auxiliary electrode at a more negative potential that that of said cathode such that ionized gas from said plasma impinges on said one surface of said auxiliary electrode to sputter-deposit said low-work-function material onto said electron emissive surface of said cathode.

8. The improved device of claim 1 wherein said vacuum chamber also contains a target electrode connected to a second voltage source at a more negative potential than that of said cathode or said auxiliary electrode to extract gas ions from said plasma and thereby sputter portions of target material, said vacuum chamber further containing a substrate disposed to receive said sputtered target material.

4,046,667
MICROELECTROPHORESIS APPARATUS

Philip J. Goetz, Pleasantville, N.Y., assignor to Pen Kem, Inc., Croton-On-Hudson, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,299
Int. Cl.² G01N *27/26, 27/28*
U.S. Cl. 204—299 R **30 Claims**



1. Apparatus for measuring the electrophoretic mobility of particles migrating in a suspending medium under the influence of an applied electric field comprising:

an electrophoresis chamber,

a microscope having an objective lens system and an ocular lens system, said microscope being positioned to view said chamber along an optical path extending from said chamber through said objective lens system toward said ocular lens system,

optical means associated with said microscope to intercept said optical path between said chamber and said ocular lens system,

means for scanning said optical means relative to said optical path, and means coupled to said scanning means for controlling the scanning of said optical means wherein the improvement comprises disposing said optical means relative to said microscope such that said optical means intercepts said optical path between said objective lens system and said ocular lens system.

4,046,668
DOUBLE SOLVENT EXTRACTION OF ORGANIC CONSTITUENTS FROM TAR SANDS

Malvina Farcasiu, Princeton, and Darrell Duayne Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,597
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE **7 Claims**

1. A process for recovering hydrocarbons from tar sand which comprises:

A. mixing tar sand with a solvent mixture of light naphtha comprising C_3 to C_9 carbon atoms per molecule and methanol to produce a light naphtha fraction with solublized non-polar components, a methanol fraction with solublized polar components and a solid sand fraction with accumulated asphaltenes on the sand surface;

B. separating by decanting said light naphtha fraction from said methanol fraction,

C. separating said methanol fraction from said solid, sand fraction, and

D. separating and recovering polar and non-polar components from said separated solvent mixture components.

4,046,669
SOLVENT EXTRACTION OF OIL FROM TAR SANDS UTILIZING A TRICHLOROETHYLENE SOLVENT

Neal Franklin Blaine, deceased, late of Lomita, Calif., and Geneva Blaine, executrix, 26007 S. Lucille Ave., Lomita, Calif. 90717

Continuation of Ser. No. 537,654, Dec. 31, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,165
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE **2 Claims**

1. In an oil solvent extraction process wherein a tar sand is contacted with a solvent at mild conditions of temperatures from 70° F. to about 800° F. and pressures from 0 to about 200 psig, the improvement wherein said solvent is trichloroethylene and wherein said solvent is contacted with said tar sand in a contact vessel; wherein the solvent and tar is removed from the upper portion of such vessel; wherein the sand is removed from the lower portion of such vessel and wherein the solvent is removed from the extracted tar for further use in the solvent extraction process.

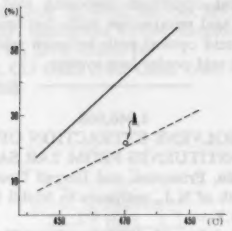
4,046,670
METHOD FOR THE TREATMENT OF HEAVY PETROLEUM OIL

Koji Seguchi, Hino; Minoru Sugita; Kazuyoshi Inada, both of Tokyo; Kiyoshi Tagaya, Funabashi, and Yuji Nakamura, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 680,439, April 26, 1976, abandoned. This application Aug. 11, 1976, Ser. No. 713,356
Claims priority, application Japan, Apr. 30, 1975, 50-51266
Int. Cl.² C10G *9/16*
U.S. Cl. 208—48 AA **3 Claims**

1. In a process for the thermal cracking of a heavy petroleum oil having an API specific gravity of not more than 25, within a tubular type heating furnace at a temperature of not less than 400° C, the improvement comprising:

mixing the heavy petroleum oil feed to the furnace with 0.5 to 5% by weight of an inorganic substance having a surface area of not less than $30m^2/g$ and an average particle diameter of not more than 30 microns, said inorganic



material containing, as principal components, a high melting oxide and an iron oxide, said inorganic material being obtained by alkali treatment of a member selected from the group consisting of Laterite, Garnierite, Magnesite, Fly ash and Kyoto yellow ochre and mixtures thereof.

4,046,671

REDUCTION OF PLATINUM GROUP METAL CATALYSTS

Bernard Whiting Burbidge, Leatherhead; Terence John Cook, Bexleyheath, and Roger Crowson, Richmond, all of England, assignors to The British Petroleum Company Limited, London, England

Filed Nov. 15, 1974, Ser. No. 524,314

Claims priority, application United Kingdom, Dec. 5, 1973, 56313/73

Int. Cl.² C10G *35/08;* B01J *37/16*

U.S. Cl. 208—138 **11 Claims**

1. A method for reducing catalysts of a platinum group metal on a support which method comprises contacting the catalyst with hydrogen for a reduction time period in the range of 1 to 24 hours at elevated temperature in the range of 350° to 480° C characterized in that the catalyst is brought to a reduction temperature in the range 350° to 480° C in a non-reducing wet atmosphere before the introduction of hydrogen and the reduction is carried out under superatmospheric pressure without dropping the temperature of the catalyst below 350° C in the presence of moisture to produce amorphous platinum group metal of particle size less than 20A.

4,046,672

HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC COMPOSITE

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application May 20, 1976, Ser. No. 688,453

The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.

Int. Cl.² C10G *35/08*

U.S. Cl. 208—139 **27 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt, and tin are uniformly dispersed throughout the porous carrier material; wherein the average crystallite size of the tin and catalytically available cobalt is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the tin is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state of in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

24. An acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt, and tin are uniformly dispersed throughout the porous carrier material; wherein the average crystallite size of the tin and catalytically available cobalt is less than 100 Angstoms in maximum dimension; wherein substantially all of the platinum group metal is present in the corresponding elemental metallic state; wherein substantially all of the tin is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

4,045,673

SIMPLIFIED REGENERATION PROCEDURE

John D. Paynter; Beverly B. Fuqua, both of Baton Rouge, La., and Richard R. Cecil, Mendham, N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 388,745, Aug. 16, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,242

Int. Cl.² C10G *35/08;* B01J *11/18*

U.S. Cl. 208—140 **19 Claims**

5. In a process for the catalytic conversion of a naphtha feed stock wherein said naphtha feed stock and hydrogen are contacted with a catalyst comprising from about 0.01 to about 3.0 wt. % of an iridium component contained on a refractory inorganic oxide support at reforming conditions, the catalyst having been at least partially deactivated during contact with said naphtha feed stock by the deposition of carbonaceous residues thereon, a method for regenerating said catalyst comprising:

1. contacting said carbonaceous residue-containing catalyst, after being contacted with said naphtha feed stock but prior to contact with oxygen at a temperature greater than about 775° F., with a chlorine-containing reagent in an amount sufficient to increase and maintain the catalyst chlorine content to from 0.8 to 1.5 wt. %, based on anhydrous, carbonaceous residue-free catalyst, to inhibit the agglomerated iridium on said catalyst during the subsequent burn operation;
2. contacting said chlorinated carbonaceous residue-containing catalyst with a substantially halogen-free and sulfur-free gaseous mixture containing oxygen at a maximum temperature varying from about 775° to 900° F. for a time sufficient to burn a substantial portion of said carbonaceous residues from said catalyst while maintaining at least 0.7 wt. % chlorine on said catalyst during contact with said gas mixture; and
3. contacting said carbonaceous residue-depleted catalyst from step (2) with said naphtha feed stock at reforming conditions without having previously contacted said catalyst with an oxygen-containing gas at a temperature in excess of about 900° F.

4,046,674

PROCESS FOR REMOVING ARSENIC FROM HYDROCARBONS

Dean Arthur Young, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed June 25, 1976, Ser. No. 700,017

Int. Cl.² C10G *23/02*

U.S. Cl. 208—251 H **27 Claims**

1. A process comprising:

a. contacting a hydrocarbon feedstock containing at least 2 ppmw arsenic at elevated temperatures with a catalytic absorbent comprising between about 30 and 70 wt.% of one or more nickel components (as NiO) and 2 and 20 wt.% of one or more molybdenum components (as MoO_3) composited with a refractory oxide, said nickel and molybdenum components comprising a nickel sulfide and a molybdenum sulfide, until a weight of arsenic at least equal to the weight of nickel in the catalytic absorbent has been absorbed thereon; and

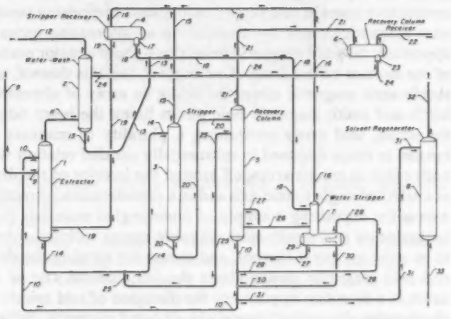
b. withdrawing from said contacting a product oil stream containing arsenic in a lower concentration than said feedstock.

4,046,675

AROMATIC HYDROCARBON SEPARATION VIA SOLVENT EXTRACTION

George F. Asselin, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 22, 1976, Ser. No. 679,275
Int. Cl.[2] C10G *21/28*
U.S. Cl. 208—321 10 Claims



1. A method for separating polar hydrocarbons from a mixture thereof with non-polar hydrocarbons and an aqueous solvent characteristically selective for absorbing polar hydrocarbons, which method comprises the steps of:

a. introducing said mixture into a first fractionation column, removing a water-containing, non-polar hydrocarbon-rich stream from an upper portion of said first column and removing a solvent-rich, polar hydrocarbon-containing stream from a lower portion of said first column;

b. introducing at least a portion of said solvent-rich, polar hydrocarbon-containing stream into a second fractionating column, removing a polar hydrocarbon-rich stream, substantially free from solvent and non-polar hydrocarbons, from an upper portion of said second column, removing a first solvent-rich stream, substantially free from hydrocarbons, from a lower portion of said second column and removing a hydrocarbon-containing, second solvent-rich stream from an intermediate portion of said second column;

c. separating water from said non-polar hydrocarbon-rich stream removed from the upper portion of said first column in step (a) and vaporizing the same to form steam;

d. introducing stream from step (c) as a vaporous stripping medium into said second fractionation column through a locus below that from which said second solvent-rich stream is removed; and,

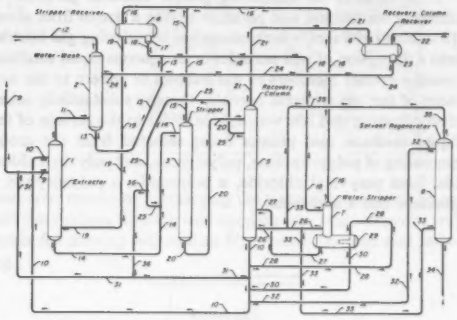
e. introducing at least a portion of said second solvent-rich stream into said first fractionation column.

4,046,676

AROMATIC HYDROCARBON SEPARATION VIA SOLVENT EXTRACTION

George F. Asselin, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 22, 1976, Ser. No. 679,273
Int. Cl.[2] C10G *21/28*
U.S. Cl. 208—321 8 Claims



1. A process for the recovery of polar hydrocarbons from a mixture thereof with non-polar hydrocarbons, which process comprises the steps of:

a. introducing said polar/non-polar hydrocarbon mixture into an extraction zone and therein countercurrently contacting said mixture with a solvent characteristically selective for absorbing polar hydrocarbons, removing a non-polar hydrocarbon raffinate stream from said zone and removing a polar hydrocarbon, solvent-rich extract phase from said zone;

b. introducing said extract phase into a stripper column, removing a non-polar hydrocarbon concentrate from said stripper column, through an upper locus thereof, and removing a solvent-rich, polar hydrocarbon concentrate through a lower locus thereof;

c. introducing said polar hydrocarbon concentrate into a recovery column, through an upper first locus thereof, introducing a first vaporous stripping medium into a lower second locus thereof, recovering a substantially solvent-free, polar hydrocarbon concentrate through an upper third locus thereof, removing a substantially hydrocarbon-free, first solvent-rich stream from a lower fourth locus thereof and removing a second solvent-rich stream, containing hydrocarbons, through a fifth locus intermediate said first and second loci;

d. introducing a portion of said first solvent-rich stream into the upper section of a solvent regenerating zone and introducing a second vaporous stripping medium into the lower section of said regenerating zone and recovering a regenerated solvent stream containing substantially all of the second vaporous stripping medium;

e. introducing said regenerated solvent stream into said recovery column as at least a portion of said first vaporous stripping medium;

f. introducing a portion of said second solvent-rich stream into said stripper column through an intermediate locus thereof; and,

g. introducing another portion of said second solvent-rich stream, with said polar/non-polar hydrocarbon mixture, into said extraction zone.

4,046,677

METHOD FOR SEPARATING LARGE-SIZED FILM-LIKE PLASTICS

Kozo Saitoh, Tokyo; Hiroshi Tanaka, Chofu; Tatsuya Nagahama, Tokyo, and Sumio Izumi, Kokubunji, all of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Nihonbashi, Japan

Filed May 14, 1974, Ser. No. 469,925
Claims priority, application Japan, July 21, 1973, 48-81880
Int. Cl.[2] B03D *1/02*
U.S. Cl. 209—166 9 Claims

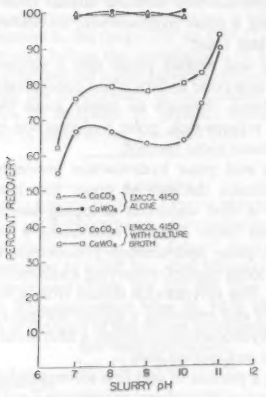
1. A method for separating plastic film-like particles of differing wettability, said particles having a size of from about 10 to about 100 mm, which comprises introducing gas bubbles into a dispersion of said particles in an aqueous liquid medium; causing greater members of gas bubbles to adhere to the surfaces of the less wettable particles thereby substantially selectively floating said less wettable particles to the surface of the liquid medium; said plastics being selected from the group consisting of polypropylene, polystyrene, soft polyvinyl chloride, hard polyvinyl chloride, a polyamide, a polyacrylate, a phenolic and a melamine.

4,046,678

FLOTATION OF SCHEELITE FROM CALCITE WITH A MICROBIAL BASED COLLECTOR

James Edward Zajic, 25 Redford Road, London, Ontario, Canada, and Naim Kosaric, E.T.H. Technisch Chemisches Laboratorium, Universitatstrasse 6, 8006 Zurich, Switzerland

Filed Sept. 9, 1975, Ser. No. 611,719
Int. Cl.[2] B03D *1/02*
U.S. Cl. 209—166 9 Claims



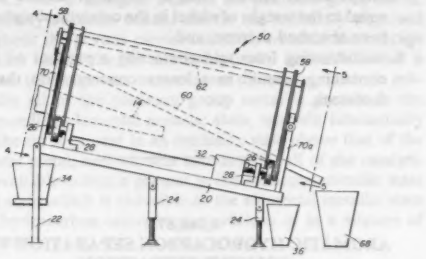
1. A process of treating an aqueous slurry of a mixture of calcite mineral ore and scheelite mineral ore by froth flotation process so as to obtain a second mixture of calcite and scheelite in which the relative proportion of scheelite is increased, which comprises adding to said aqueous slurry a surface active frother and a microbial based collector and agitating the slurry to cause frothing thereof, the microbial base collector being a product of the aerobic fermentation of a hydrocarbon substrate and a mixture of cultures including at least one culture of the genus Pseudomonas or the genus Alcaligenes in an aqueous fermentation medium, and recovering from the froth said second mixture of calcite and scheelite containing relatively increased proportion of scheelite.

4,046,679

MAGNETIC DRUM MATERIALS SEPARATOR

Ernst F. R. A. Schloemann, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Nov. 28, 1975, Ser. No. 636,176
Int. Cl.[2] B03C *1/12*
U.S. Cl. 209—212 18 Claims



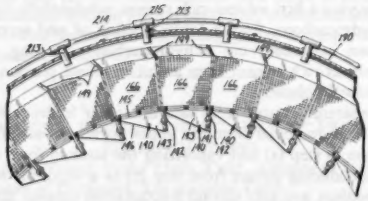
1. A magnetic rotary drum materials separating system for separating electrically conductive items from a supply of commingled materials comprising a drum disposed at a selected angle to the horizontal, said drum having on its inner surface means for separating electrically conductive items from nonconductive items in said supply, said means comprising steady-state magnetic means for establishing an alternating series of oppositely directed magnetic fields throughout a major portion of the interior of the drum at an angle to the axis thereof, said steady-state magnetic means including an array of alternating north and south magnetic pole pieces lining the inner side of the drum, said array comprising a plurality of magnets arranged in strips disposed in substantially parallel relation with each other in spirals arranged around the interior of the drum at a selected angle to said axis and in a predetermined direction; means for depositing a supply of commingled materials to be separated on said steady-state magnetic means within the drum at an axial midpoint thereof, and means for rotating the drum and said magnetic means about the longitudinal axis of the drum in a direction opposite to the direction of said spirals for causing the alternating oppositely directed magnetic fields to pass sequentially through said commingled materials and causing eddy currents to be induced in electrically conductive items in the comingled materials to produce force components which move said conductive items progressively axially upwardly toward the upper end of the drum.

4,046,680

PERMANENT MAGNET HIGH INTENSITY SEPARATOR

Alan J. Fritz, Grand Rapids, Minn., assignor to Itasca Magnetics, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 558,337, Oct. 17, 1975, Pat. No. 3,947,349. This application Jan. 29, 1976, Ser. No. 653,366
Int. Cl.[2] B03C *1/14*
U.S. Cl. 209—214 8 Claims



1. The method of separating magnetic particles from nonmagnetic particles as components of a slurried mixture thereof which comprises steps of:

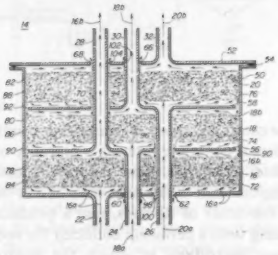
feeding the slurry to the outer surface of a hollow filter drum rotatable on a horizontal axis, for passage therethrough as a plurality of separate inwardly moving streams;
magnetically delaying the passage of magnetic particles through said filter to emerge from said filter at a different time from the nonmagnetic particles;
separately receiving the magnetic and nonmagnetic particles discharged inwardly of said drum;
and preventing said discharged material from flowing around the inside of said drum as the drum rotates.

4,046,681

MULTIPLE MATRIX ASSEMBLY AND MATRIX UNIT FOR MAGNETIC SEPARATOR WITH SIMPLIFIED SEALING

Peter G. Marston, Gloucester, and John J. Nolan, Cambridge, both of Mass., assignors to Sala Magnetics, Inc., Cambridge, Mass.

Filed July 10, 1975, Ser. No. 594,708
Int. Cl.² B03C *1/02*
U.S. Cl. 209—224 **7 Claims**



1. A multiple matrix assembly for a magnetic separator comprising:
a container;
a plurality of magnetic matrices arranged in a longitudinal stacked array in said container; each matrix having a feed and a collection area on opposite longitudinal ends transverse to the longitudinal axis of said container and the flow through it, and having a peripheral portion surrounding it and extending longitudinally between said feed and collection areas, said matrices being disposed with their feed areas all facing in a first direction and their collection areas all facing in a second direction;
inlet and outlet means in said container for feeding to and collecting from said matrices; and
open receptacle means, disposed between each pair of adjacent matrices, each of said receptacle means including a transverse member proximate and coextensive with only one of said feed and collection areas, and a peripheral member extending longitudinally in one of said first and second directions from said transverse member along and sealingly engaged with said peripheral portion of said matrix.

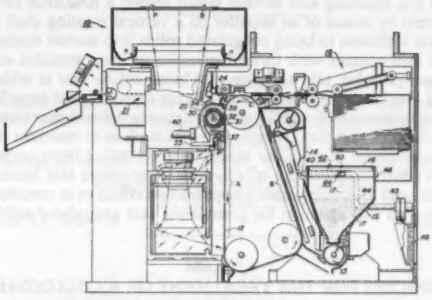
4,046,682

TONER RECLAIMING SYSTEM

Frederick W. Hudson, West Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 17, 1973, Ser. No. 324,248
Int. Cl.² B07B *1/10*
U.S. Cl. 209—250 **4 Claims**

1. In a copier having a photosensitive surface for supporting toner images, the combination comprising conduit means, cleaning means located in said conduit means for removing toner from said surface, a housing in communication with said conduit means, suction means in communication with said conduit means and said housing for conveying toner particles away from said cleaning means, a movable endless filter means disposed in said housing for trapping and passing toner particles above and below, respectively, a predetermined size, a development system including a reservoir for toner particles, an opening in said housing means communicating with said



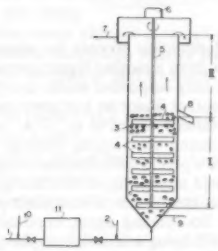
reservoir, means for discharging the trapped toner particles on said filter means through said opening into said reservoir, and means for moving said endless filter means through said housing.

4,046,683

PROCESS FOR SEPARATING SUSPENDED METAL OXIDE AND METAL HYDROXIDE SOLIDS FROM A MOTHER LIQUOR

Shogo Tsunoda; Katsuyuki Katsoka, both of Yokohama, and Toshinori Baba, Kawasaki, all of Japan, assignors to Ebara Infilco Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 481,948, June 21, 1974, abandoned. This application May 13, 1976, Ser. No. 686,195
Claims priority, application Japan, Apr. 10, 1974, 49-40779; Apr. 10, 1974, 49-40780
Int. Cl.² B01D *21/01;* C02B *1/20;* C02C *5/02*
U.S. Cl. 210—20 **13 Claims**



1. A water-clarification process for separating suspended metal oxide and metal hydroxide solids from a mother liquor which may also contain metal ions and phosphate ions, the concentration of suspended solids being less than 10 g/l of said mother liquor, comprising the steps of adding to said mother liquor a high molecular weight organic flocculating agent, hereinafter referred to as "OFA", said OFA being selected from the group of polymers consisting of polyacrylamide, partially hydrolyzed polyacrylamide, and sodium polyacrylate, said polymer having a molecular weight between 500,000 and 6,000,000 in an amount sufficient for coagulating said solids, holding said OFA-treated mother liquor for a period sufficient for completion of coagulation, adding to said mother liquor containing coagulated solids after completion of coagulation an inorganic metal salt flocculating agent, hereinafter referred to as "IFA", passing essentially the entire quantity of said OFA- and IFA-treated mother liquor through an appara-

tus in an upward direction, said apparatus having in the lower section thereof a blanket layer of granulated solids formed from said coagulated solids, the concentration of granulated solids being from a lower limit of 3 times the concentration of suspended solids in the said mother liquor to an upper limit of 150 g/l, agitating said mother liquor impart a rotational flow thereto by means of an impeller on a vertical rotating shaft at a rate sufficient to bring coagulated solids into mutual contact and into contact with formed granules to form granules and larger granules, said agitation rate being below that at which said blanket layer is disrupted, the tip speed of said impeller lying between 0.05 and 0.7 m/sec., drawing off said granulated solids from said blanket layer at a rate such as to maintain the concentration of granular solids in said blanket layer within said limits, and drawing off clarified water above said blanket layer, said IFA being added in an amount effective in combination with said agitation for granulating said coagulated solids.

4,046,684

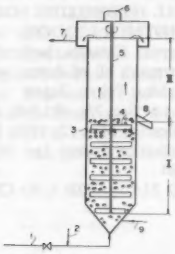
PROCESS FOR THE TREATMENT OF A COLLOIDAL SUSPENSION

Shogo Tsunoda, and Katsuyuki Kataoka, both of Yokohama, Japan, assignors to Ebara Infilco Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 481,947, June 21, 1974, abandoned. This application May 13, 1976, Ser. No. 686,197

Int. Cl.² C02B *1/20*

U.S. Cl. 210—20 **13 Claims**



1. A water-clarification process for separating colloidally-suspended solids from a mother liquor containing less than 10 g/l of said colloidally-suspended solids, comprising the steps of adding to said mother liquor an inorganic metal salt flocculating agent, hereinafter referred to as "IFA" in an amount sufficient for coagulating said solids, holding said IFA-treated mother liquor for a period sufficient for completion of coagulation, adding to said mother liquor containing coagulated solids immediately after completion of coagulation a high molecular weight organic flocculating agent, hereinafter referred to as "OFA", said OFA being selected from the group of polymers consisting of polyacrylamide, partially hydrolyzed polyacrylamide, and sodium polyacrylate, said polymer having a molecular weight between 500,000 and 6,000,000, introducing essentially the entire quantity of said IFA- and OFA- treated mother liquor into an apparatus for upward flow therethrough, said apparatus having in the lower section thereof a blanket layer of granulated solids formed from said coagulated solids, the solids concentration in said blanket layer lying between a lower limit of 3 times that of the colloidally-suspended solids in said mother suspension and an upper limit of 150 g/l, agitating said mother liquor to impart a rotational flow of said mother liquor at a rate sufficient to bring said coagulated solids in mutual contact and form said granulated solids, said agitation rate being below that at which said blanket is disrupted, and said agitation being effected by impellers rotating about a vertical shaft with a tip speed between 0.05 and 0.7 m/sec, drawing off said granulated solids from said blanket layer at a rate such as to maintain the concentration of granular solids in said blanket layer within said limits, and drawing off clarified water above said blanket layer, said OFA being added in an amount effective in combination with said agitation for granulating said coagulated solids.

4,046,685

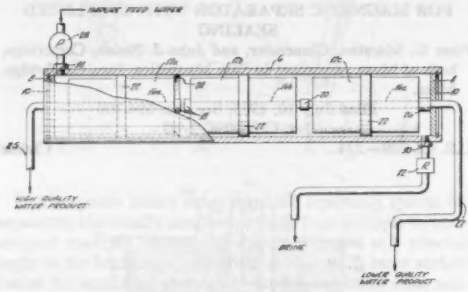
SIMULTANEOUS PRODUCTION OF MULTIPLE GRADES OF PURIFIED WATER BY REVERSE OSMOSIS

Donald Thedore Bray, Escondido, Calif., assignor to Desalination Systems, Inc., Escondido, Calif.

Continuation-in-part of Ser. No. 382,909, July 26, 1973. This application Mar. 17, 1976, Ser. No. 667,842

Int. Cl.² B01D *13/00, 31/00*

U.S. Cl. 210—23 H **9 Claims**



1. Reverse osmosis apparatus comprising a unitary elongated pressure resistant container housing a plurality of semipermeable membrane cartridges, said pressure resistant container having an impure feed water inlet near one of its ends, a brine outlet near the other of its ends, and a product water outlet communicating with a permeate collector for said semipermeable membrane cartridges; in which the improvement comprises:

a. said pressure resistant container housing at least two of said semipermeable membrane cartridges, arranged in end-to-end relationship, and through which said impure feed water flows sequentially, in a single stage, the unpermeated feed water from each cartridge constituting the feed water for the next cartridge in the sequence;

b. a first product water outlet from said pressure resistant container, to provide an amount of high quality, low total dissolved solids content product water, connected only to the permeate collector of at least one of said semipermeable membrane cartridges located nearest the impure feed water inlet of said pressure resistant container; and

c. a second product water outlet from said pressure resistant container, to simultaneously provide an amount of lower quality, higher total dissolved solids content product water, connected only to the permeate collector of the remainder of said semipermeable membrane cartridges in said pressure resistant container.

4,046,686

REVERSE OSMOSIS TREATMENT OF BATTERY WASTE

Melvin Goldstein, Mountain Brook, Ala., assignor to Crane Co., New York, N.Y.

Continuation of Ser. No. 573,185, April 30, 1975, abandoned. This application Jan. 7, 1977, Ser. No. 757,528

Int. Cl.² B01D *13/00*

U.S. Cl. 210—23 H **14 Claims**

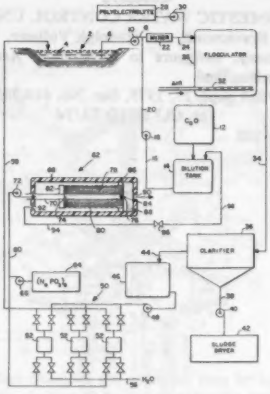
1. A process for the treatment of acid waste comprising the steps of:

a. introducing a lime solution into the acid waste, thereby neutralizing the acid and precipitating calcium sulphate;

b. mechanically removing precipitated matter from the neutralized waste;

c. introducing a sequestering agent into the liquid which remains after removal of the precipitated matter, to sequester dissolved calcium;

d. introducing into a permeator, the liquid which results after the introduction of the sequestering agent and there effecting, by reverse osmosis, a separation of the last mentioned liquid into a first component consisting of essentially pure water, and a second component comprising water and separated calcium: and



e. introducing the second component into the lime solution prior to the aforementioned introduction of the lime solution into the acid waste, to thereby convert the sequestering agent to a less effective form removable in said mechanical removal or reverse osmosis steps.

4,046,687

PROCESS FOR THE ADSORPTIVE REMOVAL OF ARSENIC, ANTIMONY AND/OR BISMUTH FROM AN AQUEOUS SOLUTION

Reinhold Schulze, Seevetal, Germany, assignor to Norddeutsche Affinerie, Hamburg, Germany

Filed Mar. 31, 1976, Ser. No. 672,334
Claims priority, application Germany, Apr. 11, 1975, 2515861
Int. Cl.[2] B01D *15/06*
U.S. Cl. 210—32 **5 Claims**

1. A process for the adsorptive removal of an element from the group which consists of arsenic, antimony and bismuth from an aqueous solution containing same, comprising: treating the solution with an adsorbent consisting of a salt of phosphoric acid or of a phosphate ester, said salt or ester being located in the pores of a porous substrate consisting of particles having a maximum particle size of 3 to 10 mm and a porosity of at least 40%, said salt being a salt of a cation selected from the group which consists of trivalent cerium and lanthanum and tetravalent titanium, zirconium and tin, and recovering said element from said adsorbent.

4,046,688

REMOVAL OF ANTIMONY FROM INDUSTRIAL STREAMS

Virginia L. Cunningham, Hatboro; James S. Clovis, Morrisville, and Marvin J. Hurwitz, Elkins Park, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Oct. 21, 1975, Ser. No. 624,359
Int. Cl.[2] C02B *1/56*
U.S. Cl. 210—37 R **11 Claims**

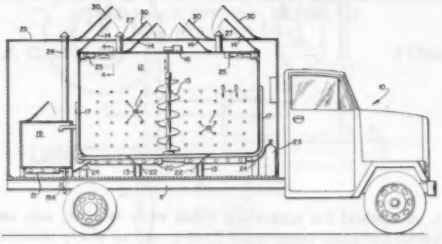
1. A process for removing antimony from an industrial stream containing a minor amount of solubilized antimony which comprises passing said industrial stream into contact with at least one ion exchange resin selected from strong acid cation exchange resin in the hydrogen form to remove antimony present as, or convertible to, the cationic form and strong base anion exchange resin in the hydroxyl form to remove antimony present as, or convertible to, the anionic form.

4,046,689

METHOD AND APPARATUS FOR TRANSPORTING SLUDGE WHILE RENDERING IT FOR CONVERSION INTO FERTILIZER

Marion H. Argyll, 15 E. Irving St., Chevy Chase, Md. 20015

Filed July 9, 1976, Ser. No. 703,948
Int. Cl.[2] C22B *11/10*
U.S. Cl. 210—59 **5 Claims**



1. An apparatus for transporting secondary sludge and effluent while rendering it usable for conversion into fertilizer, comprising the following elements:

a. a truck body having a transport bed,
b. a drum mounted on and spaced above said transport bed,
c. channels secured about the outside of the drum and communicating with the interior of the drum through openings through the wall of the drum,
d. burners carried by the drum support being spaced along and beneath said drum,
e. an archimedean screw plunger mounted in said drum for rotary and vertical movement relative thereto,
f. an effluent tank secured to said transport bed and spaced above same,
g. burners carried beneath said effluent tank and being connected to a heat source,
h. means connecting said effluent tank to said channels to receive effluent therefrom,
i. a plurality of pivotally mounted doors along the top of said drum,
j. fan means pivotally mounted to the outside of the drum for direction into the drum when the doors are open,
k. discharge doors in the bottom of said drum for discharging dried sludge, and
l. discharge means for said effluent tank; said elements cooperatively functioning the produce a dry granular material from said sludge and effluent, which forms the base for a fertilizer product and a liquid which forms the base for a urea fertilizer product.

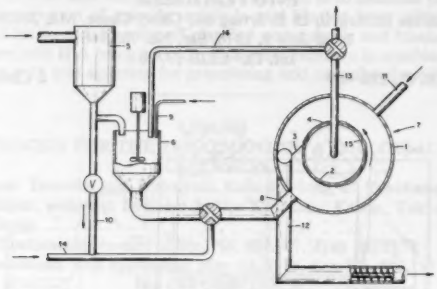
4. The method of transporting secondary sludge and effluent from a sewage system to a fertilizer plant comprising filling a drum with a mixture of sludge and effluent, heating the mixture to boiling during transport so as to separate the effluent into a separate effluent container and to dry and concentrate the sludge, aerating the sludge within the drum, and upon arriving at destination removing concentrated effluent in liquid state from the liquid effluent container and raking and dried sludge from the drum; said dried sludge providing a base for a fertilizer product and said concentrated effluent providing a base for a urea fertilizer product.

4,046,690

FILTERING COAL-DERIVED OIL THROUGH A FILTER MEDIA PRECOATED WITH PARTICLES PARTIALLY SOLUBILIZED BY SAID OIL

Billy R. Rodgers, Concord, and Michael S. Edwards, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 1, 1976, Ser. No. 672,807
Int. Cl.[2] B01D *37/02*
U.S. Cl. 210—75 7 Claims



1. A method for separating solids such as char, ash, and refractory organic compounds from a viscous slurry comprising tars, asphaltenes, and up to 25 wt.% of said solids including ash particles smaller than 1 micron, said method comprising the steps of:

a. forming a layer of partially solubilized 85–350 mesh particles of anthracite coal, bituminous coal, lignite, devolatilized anthracite coal, devolatilized bituminous coal, or devolatilized lignite on a filter media;

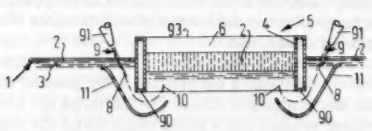
b. filtering said viscous slurry through said layer and said media at a differential pressure of about 0.1–10 atmosphere across said media and said layer so as to recover a liquid containing less than 0.15 wt.% ash.

4,046,691

METHOD FOR COLLECTING LIGHT-WEIGHT SUBSTANCE FLOATING ON A LIQUID SURFACE

Eric Irons, East Hadden, England, assignor to Ballast-Nedam Groep, N.V., Amstelveen, Netherlands

Continuation of Ser. No. 545,552, Jan. 30, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 680,449
Claims priority, application United Kingdom, Feb. 25, 1974, 9211/74; Netherlands, Aug. 23, 1974, 7411232
Int. Cl.[2] E02B *15/04*
U.S. Cl. 210—83 3 Claims



1. The method of collecting oil floating on the surface of a body of water, comprising the steps of:

a. providing an enclosure with an open bottom and side walls extending from a depth below the interface between the oil and water to above the surface of the body of water;

b. locating a nozzle above the surface of said body of water outside of and spaced from said side walls and downwardly directed for directing water from said nozzle to a location beneath the open bottom of said enclosure;

c. directing a stream of water from said nozzle through the oil on the surface of said body of water whereby said oil is displaced to a location beneath the open bottom of said enclosure and thereafter rises to the surface of the water within said enclosure; and

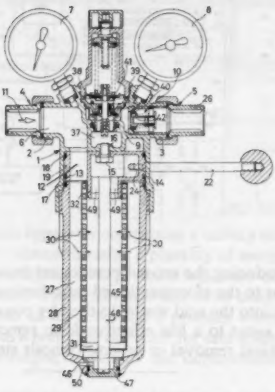
d. removing the oil from the surface of the water within said enclosure.

4,046,692

DOMESTIC WATER CONTROL UNIT

Bernhard W. Braukmann, and Rudolph Vollmer, both of Mosbach, Germany, assignors to Braukmann Armaturen AG, Rothrist, Switzerland

Filed Sept. 17, 1975, Ser. No. 614,245
Int. Cl.[2] B01D *35/14*
U.S. Cl. 210—108 3 Claims



1. A domestic water control unit comprising a housing, a filter located in said housing to provide a channel, an inlet and an outlet in line in said housing above and normal to said channel, a pressure reducer between said inlet and said outlet above said filter, a check valve in said outlet, the normal flow from said inlet being along said channel through said filter and then through said check valve to said outlet, a rotary valve between said filter and said check valve movable from a first position in which it receives said normal flow to a second position to reverse the flow from said inlet through said filter and then into said channel and a plug valve to said housing, connected to said rotary valve and responsive thereto, the arrangement being such that on normal flow the plug valve is closed but on reverse flow through operation of said rotary valve, the latter opens said plug valve to drain said unit, said rotary valve and said plug valve being co-axial and connected by means of a rod which passes axially through said filter.

4,046,693

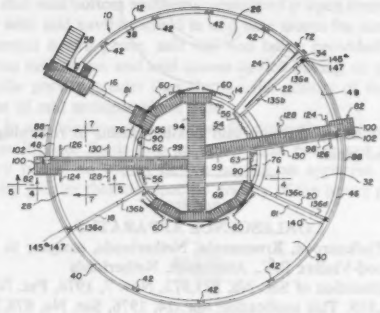
SCUM SKIMMER APPARATUS

Nolan S. Glover, Mineral Wells, Tex., assignor to Harsco Corporation, Camp Hill, Pa.

Filed Aug. 27, 1975, Ser. No. 608,286
Int. Cl.[2] B01D *21/12;* C02B *1/36;* C02C *1/16, 1/30*
U.S. Cl. 210—195 S 20 Claims

1. In a clarifier tank for removing microorganisms and waste from liquid influent: a tank having first and second ends joined by side walls; a bridge; means moveably mounting the bridge over the tank; drive means to move said bridge from a position adjacent the first end of the tank to a second position adjacent the second end of the tank; means to alternately reverse the direction of movement of the bridge between the first and second ends of the tank; a skimmer blade; a ballast chamber having an open lower end submersible below the level of liquid in the tank; means for rigidly securing the ballast chamber to

the skimmer blade; means for slideably attaching the ballast chamber to the bridge for movement in a vertical direction such that the ballast chamber and skimmer blade move in a horizontal direction with the bridge but are free to move in a vertical direction relative to the bridge to move the skimmer blade out of contact with the liquid; air supply means communicating with the interior of the ballast chamber above the liquid level therein; a valve to control the flow of air into and



out of the ballast chamber such that air may be injected under pressure into the ballast chamber to raise the ballast chamber upwardly in the liquid, and air may be vented from the ballast chamber through the valve to lower the ballast chamber into the liquid; actuating means adjacent the first end to control the valve means to move the valve to a position to admit air under pressure into the chamber; and actuating means adjacent the second end of the tank to move the valve to a position to exhaust air from the chamber.

4,046,694

APPARATUS FOR SEPARATING PARTICULATE SOLIDS FROM LIQUIDS

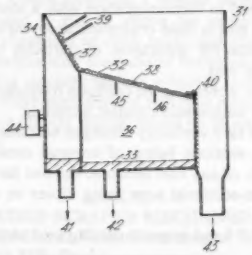
John Frederick Ellis, Preston, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Apr. 4, 1974, Ser. No. 458,043

Claims priority, application United Kingdom, Feb. 1, 1974, 4868/74

Int. Cl.² B01D *35/20*

U.S. Cl. 210—297 **3 Claims**



1. Apparatus for the separation of particulate solids from a liquid, the apparatus comprising a container, a first generally planar declivous draining screen located within the container to separate upper and lower regions of the container, means including a subsidiary generally planar declivous draining screen disposed above, inclined in the same sense as, but steeper than, the first screen for feeding a mixture of particulate solids and liquid onto the upper end of the first screen, baffles on the underside of the first screen transverse to the direction of movement of the solids to discourage adherence of liquid beneath the first screen, a weir in the form of a generally vertical barrier upstanding abruptly from and disposed at the lower end of the first screen for allowing the controlled passage of solids thereover, means for withdrawing liquid from the lower region of the container substantially below the lowest part of either screen to ensure that the screens are above the level of any liquid in the container, and means for vibrating the container to move solids along the first screen and over the weir.

4,046,695

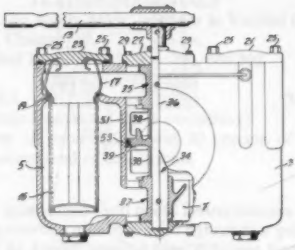
DUPLEX BASKET STRAINER ARRANGEMENT

John W. Tucker, 10 - 38th Avenue, Ile Perrot, Quebec, Canada

Filed June 7, 1976, Ser. No. 693,726

Int. Cl.² B01D *35/12*

U.S. Cl. 210—340 **5 Claims**



1. A duplex basket strainer arrangement comprising:

an outer casing having a first basket strainer receptacle at one end thereof, a second basket strainer receptacle at the other end thereof, a center plug receptacle having an inner wall surface and being disposed between said first and second receptacles, inlet means disposed in one side wall of said casing for permitting entry of a fluid into said casing, and outlet means in the other side wall of said casing for permitting exit of said fluid from said casing;

a center plug disposed in said center plug receptacle, said center plug comprising an elongated shaft member, extending through, and being coaxial with, said center plug receptacle, an inflow stage comprising an inflow valve circular in cross-section, an outflow stage comprising an outflow valve circular in cross-section, said shaft being mounted for rotation therewith, a circular separator plate mounted on said shaft for relative rotation and disposed in said center plug receptacle between said inflow and outflow valves, and spacer means on said shaft between said circular separator plate and each of said inflow and outflow valves positioning said circular separator plate axially of said shaft, and resilient means disposed around the periphery of said separator plate;

the outer diameter of said resilient means being greater than the diameter of the inner wall surface of said center plug receptacle adjacent said resilient means, said resilient means resiliently engaging the inner wall surface and providing both a fluid tight seal between said inflow stage and said outflow stage and restraining means fixing said circular separator plate against rotation;

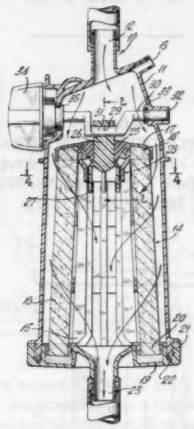
each of said valve comprising a cylindrical shell surrounding a hollow interior and having one end thereof adjacent said separator plate, said one end being open to permit communication with said hollow interior therethrough, and a side opening in each shell to permit communication with said hollow interior therethrough.

4,046,696

EXTRACORPOREAL CIRCUIT BLOOD FILTER

Herman Charles Mouwen, Ventura, Calif., assignor to Johnson & Johnson, New Brunswick, N.J. and Purolator, Inc., Del.

Continuation-in-part of Ser. No. 462,455, April 19, 1974, abandoned. This application Sept. 23, 1975, Ser. No. 615,854
Int. Cl.[2] B01D *35/02*
U.S. Cl. 210—431 1 Claim



1. An extracorporeal blood filter comprising an assembly for supporting a cartridge filter media in a housing fixedly securable to said assembly, said housing having an inlet in the top portion thereof for receiving unfiltered blood, said assembly for supporting the filter cartridge comprising a bottom member attached to the bottom of said housing, said bottom member having a blood outlet located substantially in the center of said bottom member, a hollow, permeable, cylindrical core extending upwardly within the housing from said bottom member to a top cap, filter media contained within the housing and extending from the top cap to the bottom member and about the periphery of the core, said top cap having an opening substantially in the center of said top cap, a valve member seated in said opening, a rotatable shaft mounted in the housing, a portion of said shaft being offset from the major axis of the shaft, said offset portion being connected to the valve member, and means for rotating the shaft whereby the valve member is lifter upwardly and away from the opening in the top cap and blood is allowed to flow directly through the hollow core to the blood outlet.

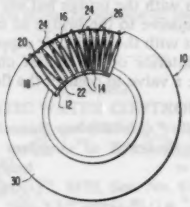
4,046,697

PLEATED PAPER FILTER

Southwick W. Briggs, 6420 Western Ave., Chevy Chase, Md. 20015, and William A. Brazerol, 2115 31st Place, SE., Washington, D.C. 20020

Continuation of Ser. No. 711,159, Feb. 27, 1968, abandoned, which is a continuation-in-part of Ser. No. 371,899, June 2, 1964, abandoned. This application Oct. 13, 1969, Ser. No. 866,169
Int. Cl.[2] B01D *27/06*
U.S. Cl. 210—457 8 Claims

1. In a filter, an elongated permeable filter element providing a lengthwise extending annular array of normally stable pleats, each being resiliently flexible in a direction generally circumferential of the filter element, and flexibly collapsible foraminous means successively extending from pleat to pleat and being secured to each pleat and interconnecting the pleats in a selectively collapsible ganged relationship to enable circumferential collapse of any particular ganged pleat towards an adjacent ganged pleat and to provide concurrent circumferential flexing movement of a plurality of successively adjacent ganged pleats when said particular ganged pleat undergoes circumferential collapse, with each of said plurality of successively adjacent ganged pleats thereafter resiliently restoring to



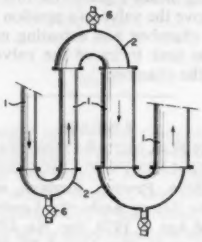
act collectively through said flexible means in returning the collapsed pleat.

4,046,698

COALESCENCE APPARATUS

Jacob Pielkenrood, Krommenie, Netherlands, assignor to Pielkenrood-Vinitex B.V., Assendelft, Netherlands

Continuation of Ser. No. 521,573, Nov. 7, 1974, Pat. No. 3,972,819. This application Apr. 14, 1976, Ser. No. 676,708
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.[2] B01D *21/00*
U.S. Cl. 210—513 4 Claims



1. In combination with gravitational separation apparatus for the gravitational separation of particles suspended in a fluid:
fluid conduit means for causing the coalescence of particles suspended in a fluid in said conduit, including
an inlet end in communication with a source of fluid,
an outlet end in fluid communication with said separation apparatus for separation of particles in the latter by gravity, and
means for increasing the collision frequency of particles in a fluid within said conduit including
at least two vertically arranged sections in said conduit, said sections being of unequal cross-sectional area with, of any two sections, the one having the greater cross-sectional area being closer to said outlet end, and
a "U" bend interconnecting said sections.

4,046,699

ACCESS DEVICE FOR CENTRIFUGAL SEPARATION ASSEMBLIES

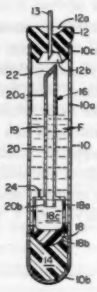
Anthony R. Zine, Jr., Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,536
Int. Cl.[2] B01D *21/26*
U.S. Cl. 210—516 10 Claims

1. An access device for use in combination with a multiple phase fluid having a light phase and a heavy phase for gaining access to the separated heavy phase of the multiple phase fluid

comprising, upright tubular means for providing access to the separated heavy phase of a multiphase fluid, and base means for supporting said upright tubular means, said base means having a closed bottom end and an open upper end, said open upper end having a cavity formed therein extending downwardly within said base means, means for mounting said upright tubular means on an upper portion of said base means, said tubular means including a tubular portion extending upwardly from said base means and having a top end and a bottom end, said bottom end being positioned in open communication with said cavity formed in said base means for access to a separated heavy phase, said top end being provided with a porous membrane, and said access device having an apparent specific gravity greater than the specific gravity of the heavy phase of said multiple phase fluid.

5. In combination with a vessel for collecting and partitioning multiphase fluids into an upper light phase and a lower heavy phase, an access device having an apparent specific gravity greater than the specific gravity of the heavy phase to



be separated for permitting access to and extraction of such lower separated heavy phase of the multiphase fluid comprising, vessel means for collecting and partitioning a multiphase fluid into a light phase and a heavy phase and for receiving said access device, partitioning media in said vessel for partitioning separated light and heavy phases of the multiphase fluid, said access device including upright tubular means for providing access to the separated heavy phase of a multiphase fluid, and base means for supporting said upright tubular means and for directing the flow of said partitioning media for partitioning separated light and heavy phases of the multiphase fluid, said upright tubular means including a tubular section having an upper end adapted to extend above the upper surface of a separated light phase and an open lower end adapted to be an open communication with a separated heavy phase, said tubular section having an outer surface which is radially inwardly offset from the outer periphery of said base means, and means for mounting said upright tubular means on an upper portion of said base means.

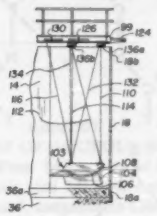
4,046,700

SLUDGE SCRAPER MECHANISM

Nolan S. Glover, Mineral Wells, Tex., assignor to Harsco Corporation, Camp Hill, Pa.

Filed July 8, 1975, Ser. No. 594,116
Int. Cl.² B01D *21/18*
U.S. Cl. 210—523 **19 Claims**

15. In a sludge settling tank having first and second end walls secured between side walls and a bottom, a sludge scraper comprising: scraper means moveable along the bottom of said tank; support means moveably secured over said tank adapted to move between said first and second end walls; a pair of support arms; means securing said support arms to said support means and flexible suspension means securing said scraper means to said support arms such that as an end of each of said support arms moves past one of the end walls the flexible suspension means is drawn over the end wall thereby lifting the



scraper means off of the bottom and then to lower the scraper means to the bottom as the support means reverses direction.

4,046,701

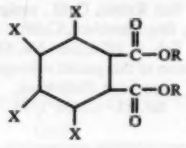
DURABLE FLAME RETARDANT FINISHES FOR TEXTILE MATERIALS

Ray E. Smith, Ann Arbor, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Feb. 23, 1976, Ser. No. 660,502
Int. Cl.² C09K *3/28*
U.S. Cl. 252—8.1 **76 Claims**

1. A flame retardant textile finish containing:

a. from about 16 percent to about 30 percent of a flame retardant compound of the formula



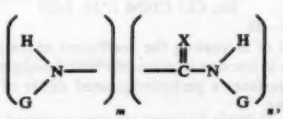
wherein each X is independently selected from chlorine or bromine, wherein each R is independently selected from the group consisting of hydrogen, hydroxyalkyl, halogenated hydroxyalkyl, and $(YO)_nH$ groups, wherein said hydroxyalkyl groups contain from 2 to 6 carbon atoms per group, wherein said halogenated hydroxyalkyl groups contain from 1 to 4 halogen atoms per group, said halogen atoms being selected from chlorine or bromine, wherein Y is an alkyl or monohalogenated alkyl group, said monohalogenated alkyl group having a halogen atom selected from chlorine or bromine, wherein n is an integer from 1 to 20, and mixtures thereof;

b. from about 3.2 percent to about 4.8 percent of a substantially water immiscible organic solvent characterized by having a flash point of at least 80° F. and a boiling point within the range of from about 300° to about 350° F.;

c. from about 3.2 percent to about 4.8 percent of an emulsifying agent possessing a hydrophile lipophile balance value of from about 10 to about 14;

d. from about 25 percent to about 45 percent of a water soluble quaternary phosphonium salt selected from the group consisting of tetrakis (hydroxymethyl) phosphonium and tetrakis (methylhydroxymethyl) phosphonium salts;

e. from about 9 percent to about 16 percent of a water soluble organic nitrogen containing compounds selected from the group consisting of



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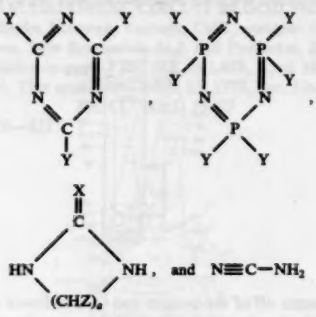


wherein each G is independently selected from the group consisting of hydrogen, hydroxymethyl, alkyl containing 1 to 6 carbon atoms, amino, and cyano; X is selected from the group consisting of oxygen, sulfur, =NH, and =NC ≡N; *m* is an integer from 0 to 1; *n* is an integer from 1 to 2 with the provision that *m* + *n* equals 2; a is an integer from 2 to 3; each Y independently is —NHG wherein G is defined above; and Z is selected from the group consisting of hydrogen and hydroxyl; and

f. from about 20 percent to about 32 percent of water.

4,046,702

LUBRICATING OIL COMPOSITION

Thomas V. Liston, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 5, 1976, Ser. No. 655,659

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

Int. Cl.² C10M *1/38*

U.S. Cl. 252—33.4 **6 Claims**

1. A lubricating composition comprising an oil of lubricating viscosity and from 10 to 10,000 parts per million of the sulfated alcohol or phenol, having a molecular weight in the range of 500–5,000, said sulfated alcohol or phenol being prepared by the steps comprising:

1. reacting (i) an aliphatic alcohol having from 1–20 carbon atoms, from 0 to 10 amino groups and from 1 to 10 hydroxy groups or phenol or a C_1 to C_{20} alkyl phenol with (ii) ethylene oxide or propylene oxide or mixtures thereof, to form a polyoxyalkylenated alcohol or phenol,
2. reacting said polyoxyalkylenated alcohol orphenol with sodium, potassium, sodium hydride, sodium methoxide, potassium methoxide or potassium t-butoxide to form the sodium or potassium salt of said polyoxyalkylenated alcohol or phenol, and
3. sulfating said sodium or potassium salt of polyoxyalkylenated alcohol or phenol by reaction with chlorosulfonic acid to form said sulfated alcohol.

4,046,703

TRACTION FLUIDS

Irl N. Duling, West Chester, and David S. Gates, Swarthmore, both of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Division of Ser. No. 598,619, July 23, 1975, abandoned, which is a division of Ser. No. 163,543, July 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 679,833, Nov. 1, 1967, Pat. No. 3,595,796. This application Nov. 26, 1975, Ser. No. 635,561

Int. Cl.² C10M *1/16, 3/10*

U.S. Cl. 252—59 **4 Claims**

1. Method of increasing the coefficient of traction between two surfaces in tractive relationship which comprises introducing to said surfaces a perhydrogenated dimer of styrene or a methylstyrene.

4,046,704

HIGH POLYMER ELECTRET

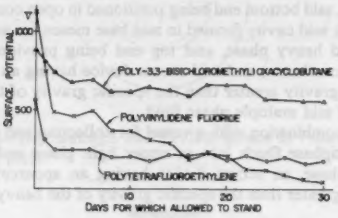
Isao Sumita, Toyonaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 13, 1973, Ser. No. 415,304

Claims priority, application Japan, Nov. 16, 1972, 47-115376

Int. Cl.² H01B *3/00*

U.S. Cl. 252—63.2 **2 Claims**



1. A high polymer electret composed, as main component, of at least one member selected from the group consisting of poly-3,3-bis-(chloromethyl)oxacyclobutane, poly-3,3-bis(-fluoromethyl)oxacyclobutane and poly-3,3-bis-(bromomethyl)-oxacyclobutane, which has been treated by applying thereto a d-c electric field of high intensity at a temperature above room temperature which is gradually reduced to room temperature.

2. A high polymer electret according to claim 1, wherein it contains additionally one member selected from polyethylene, polypropylene, polyvinylidene fluoride and polyethyleneterephthalate.

4,046,705

STABLE BLEACHING DETERGENT COMPOSITION

Kouichi Yagi, Tokyo; Makoto Yamanaka, Koganei, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 21, 1976, Ser. No. 688,531

Claims priority, application Japan, June 4, 1975, 50-67268

Int. Cl.² C11D *7/18, 7/56*

U.S. Cl. 252—99 **7 Claims**

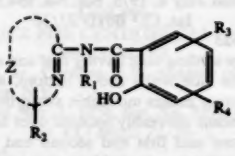
1. A stable bleaching detergent composition, consisting essentially of:

A. from about one to about 30 percent by weight of a surfactant selected from the group consisting of water-soluble anionic surfactant, water-soluble nonionic surfactant, water-soluble amphoteric surfactant and mixtures thereof;

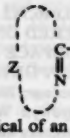
B. from about one to about 50 percent by weight of an inorganic peroxygen compound capable of releasing oxygen in aqueous solution;

C. the balance is a substance selected from the group consisting of water-soluble neutral inorganic builder salts, water-soluble alkaline inorganic builder salts, water-soluble organic builders and mixtures thereof; and

D. from 0.001 to 5 parts by weight, per 100 parts by weight of the sum of the weights of A plus B plus C, of a compound or mixture of compounds having the formula



wherein R_1 is hydrogen or alkyl having one to 3 carbon atoms;



is a monovalent radical of an unsaturated 5 member or 6 member heterocyclic ring containing only nitrogen and carbon atoms in the ring, or said heterocyclic ring fused to a benzene ring or another heterocyclic ring to give a polycyclic radical having the characteristic

grouping; R_2 is hydrogen, unsubstituted alkyl having one to 10 carbon atoms, alkyl having one to 10 carbon atoms substituted with hydroxy, chloro, amino, alkoxy (C_1 to C_{10}), phenoxy, phenyl, hydroxyphenyl or benzoylamino, unsubstituted phenyl, phenyl substituted with one or two alkyls (C_1 to C_2), chloro, hydroxy, alkoxy (C_1 to C_{10}), acyloxy (C_1 to C_4) or amino, aroyl having 6 to 8 carbon atoms, pyridyl or oxopyrrolidinyl; R_3 is hydrogen, unsubstituted alkyl having one to 22 carbon atoms, alkyl having one to 22 carbon atom substituted with hydroxy, chloro, alkoxy (C_1 to C_4), phenoxy, phenyl or amino, phenyl, phenyl substituted with one or 2 alkyls having one or 2 carbon atoms or alkoxy (C_1 to C_{10}), aroyl having 6 to 8 carbon atoms, alkoxy having one to 10 carbon atoms, phenoxy, halogen, alkylamino (C_1 to C_{10}), aminosulfonamido, alkanoyloxy (C_2 to C_6), aroyloxy (C_6 to C_8), carbamoyl, alkoxy (C_1 to C_{10}) carbonyl and aryl (C_6 to C_8) oxycarbonyl, or R_3 and R_4 together form a benzo group; and R_4 is hydrogen or $-R_5Y$, in which R_5 is alkylene having one to 6 carbons, alkylidene having one to 6 carbons or phenylene, and Y is a radical obtained by removing R_4 from a compound of said formula.

4,046,706

CONTACT LENS CLEANING COMPOSITION

Joseph Zenon Krezanoski, Los Altos, Calif., assignor to Flow Pharmaceuticals, Inc., Palo Alto, Calif.

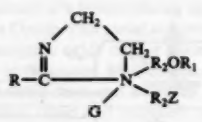
Filed Apr. 6, 1976, Ser. No. 674,159
Int. Cl.[2] C11D *1/94, 1/88*
U.S. Cl. 252—106 19 Claims

1. An aqueous composition for cleaning contact lenses which comprises:

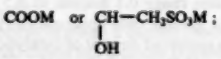
a. about 0.01% to about 40% of a poly (oxyethylene)-poly(oxypropylene) block copolymer having a molecular weight between about 1900 and 15,500, a water solubility in excess of about 10 grams per 100 ml, a cloud point in 1% aqueous solution above about 30° C and a Foam Height in excess of 30 mm;

b. about 2% to about 25% ethyl or isopropyl alcohol; and

c. about 2% to about 25% of an amphoteric surfactant having the formula



in which R is a C_6 to C_{24} hydrocarbon radical, selected from straight or branch chain, saturated or unsaturated, aliphatic hydrocarbon or an alkyl-aryl group in which the alkyl group contains at least six carbon atoms; R_1 is H, alkali metal, or CH_2COOM; R_2 is a C_1 to C_4 alkylene group; Z is



M is alkali metal, H or a nitrogen containing organic base; and G is OH, or a radical comprising the acid group of a C_6 to C_{24} anionic surface active sulfate or sulfonate.

4,046,707

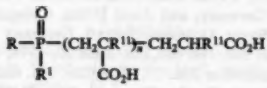
TREATMENT OF AQUEOUS SYSTEMS

Malcolm John Smith; Peter Miles, both of Stockport; Norman Richardson, Middleton, and Michael Anthony Finan, Macclesfield, all of England, assignors to Ciba Geigy (UK) Limited, London, England

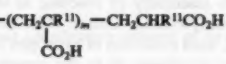
Filed May 29, 1975, Ser. No. 582,402
Claims priority, application United Kingdom, June 11, 1974, 25853/74
Int. Cl.[2] C02B *5/06*
U.S. Cl. 252—180 5 Claims

1. A method of inhibiting the precipitation of the scale forming salts of calcium, magnesium, barium and strontium from aqueous systems comprising adding to the aqueous system a minor but effective scale-inhibiting amount of a product comprising a telomeric compound of the formula:

I



or salts thereof, wherein R^{11} is hydrogen of a methyl or ethyl residue, R is a residue of formula:



wherein R^{11} has its previous significance, and the sum of $n + m$ is an integer of at most 100, and R^1 is OH.

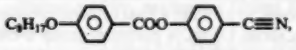
4,046,708

MIXTURE OF NEMATIC LIQUID CRYSTALS EXHIBITING A POSITIVE DIELECTRIC ANISOTROPY AND A WIDE TEMPERATURE RANGE

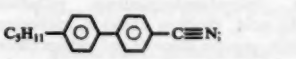
Jean-Claude Dubois, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Nov. 25, 1974, Ser. No. 526,930
Claims priority, application France, Nov. 28, 1973, 73.42293
Int. Cl.[2] C09K *3/34;* G02F *1/13*
U.S. Cl. 252—299 2 Claims

1. A mixture of nematic liquid crystals consisting essentially of about two moles of:



about one mole of:



the mixture having a nematic range of about 0° C. to 70° C.

4,046,709

METHOD OF MANUFACTURING CARBONACEOUS GRANULAR MOLECULAR SIEVE

Nakaji Yuki, Kawaguchi, Japan, assignor to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 24, 1975, Ser. No. 561,164
Int. Cl.² B01J 37/00, 21/18; C01B 31/00
U.S. Cl. 252—421 5 Claims

1. A method of manufacturing carbonaceous granular molecular sieves having a pore diameter in the range of about 3–10 A comprising the steps of subjecting a vinylidene chloride copolymer to a thermal carbonization treatment for removal of hydrogen chloride gas, cooling and pulverizing the resultant product to a grain size smaller than 100 mesh, admixing per 100 parts of said pulverized product 15 to 35 parts of a carbonaceous sintering agent and 8 to 15 parts of an organic pelletizing binder generating gas upon heating, pelletizing the resultant mixture and carbonizing the resultant pellets without activation at a temperature ranging from 400° C to 900° C for a period ranging from 2 to 6 hours, all parts being by weight.

4,046,710

POLYMERIZATION OF CYCLIC OLEFINS

Günther Lehnert; Dieter Maartens; Gottfried Pampus, all of Leverkusen, Germany, and Josef Witte, Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 481,188, June 20, 1974, abandoned. This application Jan. 27, 1976, Ser. No. 652,884
Claims priority, application Germany, June 27, 1973, 2332563
Int. Cl.² C08F 4/78
U.S. Cl. 252—429 B 5 Claims

1. A process for the preparation of a catalyst composition which consists essentially of reacting at least one halide or oxyhalide of molybdenum with at least one 2-haloalcohol at −30° to 20° C. until evolution of hydrogen halide ceases either in the absence of solvent or in the presence of at least one chlorinated polar solvent which is inert towards the molybdenum compound and in which the molybdenum compound is soluble at least to the extent of being able to obtain a 0.01 molar solution, and then adding at least one organoaluminum compound selected from the group consisting of aluminum alkyl and aluminum haloalkyl, the mole ratio of molybdenum compound to the haloalcohol being 1:1 to 1:10 and the mole ratio of the molybdenum compound to the organoaluminum compound being 1:0.5 to 1:30.

4,046,711

METHOD OF CATALYST MANUFACTURE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed June 24, 1976, Ser. No. 699,748
Int. Cl.² B01J 27/08, 27/10, 23/14
U.S. Cl. 252—441 9 Claims

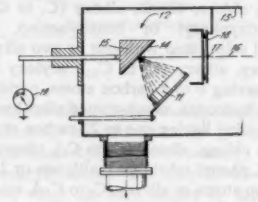
1. A method of catalyst manufacture which comprises impregnating a porous high surface area carrier material with a non-aqueous solution of soluble platinum group metal compound and a halo-substituted germane containing less than four halo substituents in amount to provide a final catalyst containing from about 0.05 to about 1.0 wt.% platinum group metal and from about 0.05 to about 1.0 wt.% germanium, said platinum group metal compound being selected from the group consisting of chloroplatinic acid, platinum chloride, ammonium chloroplatinate, dinitrodiaminoplatinum, palladium chloride, chloropalladic acid, rhodium chloride, ruthenium chloride, ruthenium oxide, osmium chloride and iridium chloride, and drying and calcining the thus impregnated carrier material.

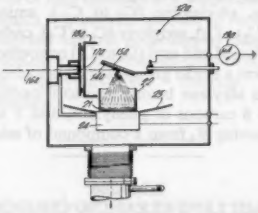
4,046,712

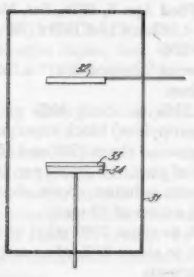
CATALYSTS SPUTTERED ON SUBSTANTIALLY NONPOROUS LOW SURFACE AREA PARTICULATE SUPPORTS

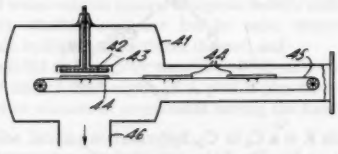
James Anthony Cairns, Wantage; Richard Stuart Nelson, Goring on Thames, and Rhydwyn William Barnfield, Cumnor Hill, all of England, assignors to United Kingdom Atomic Energy Authority, London, England

Continuation-in-part of Ser. No. 418,966, Nov. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 375,744, July 2, 1973, abandoned. This application June 16, 1975, Ser. No. 587,281
Claims priority, application United Kingdom, Nov. 30, 1972, 55466/72
Int. Cl.² B01J 23/56, 21/04, 21/14, 35/10
U.S. Cl. 252—447 4 Claims









1. A catalyst comprising a hard, substantially non-porous particulate substrate selected from the group consisting of ceramic material and carbon and having a mean particle diameter within the size range 0.1 micron to 0.5 centimeters and a surface area not greater than approximately 20 square meters per gram, and a sputtered deposit of catalytic material comprising one or more of the metals from the group platinum, rhodium, palladium, ruthenium, osmium and iridium upon the

substrate, said deposit of said catalytic material having been deposited by bombardment of said catalytic material with energetic ions, the bombardment dislodging atoms of said catalytic material which are then deposited as an atomic dispersion upon the substrate.

2. A catalyst as claimed in claim 1, wherein the sputtered deposit of catalytic material comprises a quantity of catalytic material equivalent to between 0.5 and 5 monatomic layers upon the substrate surface.

4. A catalyst as claimed in claim 1, wherein the ceramic material comprises alumina.

4,046,713

METHOD OF MANUFACTURING AN EXTRUDED CATALYST COMPOSITION

Roy T. Mitsche, Island Lake; Hillard L. Kuntz, Mount Prospect, and John C. Hayes, Palatine, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 400,290, Sept. 24, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,417

Int. Cl.² B01J *29/06*

U.S. Cl. 252—455 Z 13 Claims

1. A method of preparing an extruded catalyst composition which comprises:

a. admixing an acidic alumina hydrosol with a dry mixture consisting essentially of a finely divided alumina and a finely divided cyrstalline aluminosilicate, said crystalline aluminosilicate comprising from about 0.5 to about 20 wt. % of said dry mixture, and said hydrosol component comprising from about 2 to about 10 wt. % of the resulting mixture;

b. extruding said resulting mixture while the last-mentioned component thereof is still in the hydrosol form; and

c. drying and calcining the extrudate.

4,046,714

METHOD OF MANUFACTURING A HYDROREFINING CATALYST

Mark J. O'Hara, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 588,561, June 19, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,885

Int. Cl.² B01J *29/06, 23/13, 23/64*

U.S. Cl. 252—455 R 12 Claims

1. In the manufacture of a hydrorefining catalyst comprising a Group VIB and a Group VIII metal component impregnated on a refractory inorganic oxide carrier material wherein said carrier material is impregnated with an aqueous solution of a Group VIB metal compound and a Group VIII metal compound and thereafter dried and calcined, the improvement which comprises impregnating said carrier material with an aqueous solution comprising an anionic complex of a Group VIB and a Group VIII metal sufficient to provide a final catalyst product containing from about 5 to about 20 wt. % Group VIB metal, and with a simple salt of a Group VIII metal sufficient in combination with said anionic complex to provide a final catalyst product containing from about 0.1 to about 10 wt. % Group VIII metal.

3. The improvement of claim 1 further characterized in that said carrier material comprises alumina composited with silica in a weight ratio of from about 3:1 to about 9.5:1.

4,046,715

NONACIDIC MULTIMETALLIC DEHYDROGENATION CATALYST

Frederick C. Wilhelm, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Division of Ser. No. 501,113, Aug. 27, 1974, Pat. No. 3,966,895, which is a continuation-in-part of Ser. No. 348,379, April 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 81,512, Oct. 16, 1970, which is a continuation-in-part of Ser. No. 15,960, March 2, 1970, abandoned. This application Feb. 5, 1976, Ser. No. 655,660

Int. Cl.² B01J *21/04, 23/58, 23/62, 23/78*

U.S. Cl. 252—466 B 17 Claims

1. A nonacidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % nickel, about 0.01 to about 5 wt. % Group IVA metal, and about 0.1 to about 5 wt. % of an alkali or alkaline earth metal, wherein the platinum group metal, Group IVA metal, nickel, and alkali or alkaline earth metal are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the Group IVA metal is present in an oxidation state above that of the elemental metal and wherein substantially all of the alkali or alkaline earth metal is present in an oxidation state above that of the elemental metal.

4,046,716

NOVEL ODORANT COMPOSITIONS

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

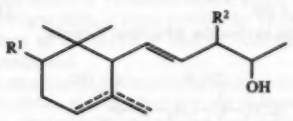
Division of Ser. No. 569,121, April 17, 1975, Pat. No. 4,010,213. This application Aug. 23, 1976, Ser. No. 716,724

Int. Cl.² C11B *9/00*

U.S. Cl. 252—522 6 Claims

1. An odorant composition which contains as an odor-imparting ingredient an effective amount of an alcohol of the general formula

(I)



wherein R^1 represents a hydrogen atom or a methyl group and R^2 represents a C_{1-6} alkyl group and wherein one of the two additional bonds indicated by dots may be present and at least one other olfactorily desirable agent.

4,046,717

DETERGENT BARS

Gordon Francis Johnston, Ellesmere Port; Alexander Martin, Warrington, and Alan Digby Tomlinson, Neston, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 438,043, Jan. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 324,622, Jan. 18, 1973, abandoned. This application Apr. 21, 1976, Ser. No. 678,784

Claims priority, application United Kingdom, Jan. 28, 1972, 4180/72

Int. Cl.³ C11D *3/33, 3/20, 17/00*

U.S. Cl. 252—546 9 Claims

1. A detergent bar consisting essentially of

a. an additive effective to increase the water content of human skin which additive is selected from the groups

i. from about 5% to about 55% by weight of a water soluble salt of glutamic acid,

ii. from about 5% to about 55% by weight of a mixture of

a water soluble salt of glutamic acid and a water soluble lactate salt, and

iii. from at least 12% by weight to about 55% by weight of a water soluble lactate salt; and

b. from about 45% to about 95% by weight of detergent active material.

4,046,718

POLYMERIZATION METHOD EMPLOYING TUBULAR REACTOR

Robert O. Mass, Midland, and Donald L. Tomkinson, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 17, 1976, Ser. No. 696,954
Int. Cl.² C08F 2/02
U.S. Cl. 260—2 R 6 Claims

1. In a method for the polymerization of an organic monomeric material to a synthetic resinous thermoplastic polymer, the polymer being soluble in the monomeric material, the steps of the method comprising passing the monomeric material into an inlet of an elongate unstirred tubular reactor maintaining the monomeric material within the tubular reactor at a temperature sufficient to induce polymerization of at least a portion of the monomer to form polymer, discharging and recovering polymerized thermoplastic material from the tubular reactor, the improvement which comprises intermittently feeding monomer material to the reactor in quantities not greater than 0.5 reactor volume converting at least 50 percent of the monomer introduced to polymer prior to discharge from the reactor subsequently introducing additional monomer.

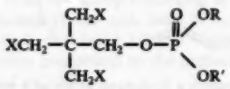
4,046,719

FLAME-RETARDANT RESINOUS COMPOSITIONS CONTAINING TRIHALONEOPENTYL HALOALKYL PHOSPHATES

Robert J. Staasback, Gladstone, N.J., and Michael J. Reale, Southeast, N.Y., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Apr. 17, 1975, Ser. No. 569,130
Int. Cl.² C08K 5/52
U.S. Cl. 260—2.5 FP 17 Claims

1. A phosphate having the structural formula



wherein each X represents bromine or chlorine; R represents haloalkyl having 2 to 4 carbon atoms and 1 to 5 halogen atoms selected from the group consisting of chlorine, bromine, and mixtures thereof, phenyl, or $-CH_2-C(CH_2X)_3$; and R′ represents haloalkyl having 2 to 4 carbon atoms and 1 to 5 halogen atoms selected from the group consisting of chlorine, bromine, and mixtures thereof.

4,046,720

CROSSLINKED, POROUS, POLYACRYLATE BEADS

Alan Rembaum; Shiao-Ping S. Yen, and William J. Dreyer, all of Altadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.

Division of Ser. No. 434,124, Jan. 17, 1974, Pat. No. 3,957,741. This application May 30, 1975, Ser. No. 582,134
Int. Cl.² C08J 9/00
U.S. Cl. 260—2.5 B 4 Claims

1. A composition consisting essentially of uniformly shaped, hydrophilic, swellable, porous, round beads, at least 80% having a diameter less than 2 microns and being the crosslinked polymer of acrylamide and 0.1 to 30 weight percent of a liquid diene or triene cross-linking agent.

4,046,721

LOW FRIABILITY POLYISOCYANURATE FOAMS

Thomas H. Austin, and George P. Speranza, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed July 30, 1976, Ser. No. 709,984
Int. Cl.² C08G 18/48, 18/14
U.S. Cl. 260—2.5 AW 12 Claims

1. A urethane-modified polyisocyanurate rigid foam comprising a reaction product obtained by bringing together in the presence of a blowing agent, an aromatic polyisocyanurate, an isocyanurate group formation catalyst and a polyol comprising the addition product of a alkylene oxide to a mixture of a novolak resin and excess phenol or phenolic derivative wherein said phenol or phenolic derivative is present in an amount of 5-25 weight percent based on the weight of said resin.

4,046,722

IMMUNOLOGICAL MATERIALS

George Ferdinand Rowland, Gerrards Cross, England, assignor to G. D. Searle & Co. Limited, Bucks, England

Filed Jan. 14, 1976, Ser. No. 648,841
Claims priority, application United Kingdom, Feb. 4, 1975, 4696/75
Int. Cl.² C08L 89/00
U.S. Cl. 260—6 13 Claims

1. A cytotoxic agent comprising an immunoglobulin specific for antigens on the surface of cells to be killed having 1–10 polymer carrier molecules convalently bound thereto, said polymer carrier having about 5–500 molecules of a cytotoxic drug covalently bound thereto and said polymer carrier having a molecular weight of 5000–500,000 and free carboxyl, amino or cycloimidocarbonate groups for covalently bonding, said cytotoxic drug also having amino or carboxyl groups available for covalent bonding.

4,046,723

AZIDE BONDING OF A PROTEIN TO A LATEX

Linneaus C. Dorman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 22, 1976, Ser. No. 679,639
Int. Cl.² C08L 89/00
U.S. Cl. 260—8 6 Claims

1. A method for coupling a latex having surface carboxylic amide groups to a protein having free amino groups which comprises hydrazinolysing the carboxylic amide group on the latex to a carboxylic hydrazide group by treatment with hydrazine, diazotizing the carboxylic hydrazide group on the latex with a nitrite in the presence of an acid to form a carboxylic azide group, and coupling the carboxylic azide group of the latex with a free amino group on the protein.

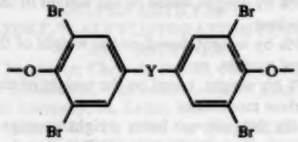
4,046,724

FIREPROOF POLYESTER COMPOSITION

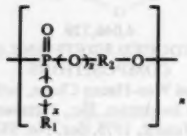
Yasuo Kato, Shiga; Katsuhiko Kato, Otsu; Masahiro Sugino, Otsu; Jun Ikegami, Otsu, and Junichi Harukawa, Otsu, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Dec. 16, 1974, Ser. No. 533,067
Claims priority, application Japan, Dec. 17, 1973, 48-141650
Int. Cl.² C08L 1/02, 67/00
U.S. Cl. 260—9 6 Claims

1. A fireproof polyester composition comprising a blend of (1) a copolymerized polyester comprising a polyalkylene terephthalate containing in the main chain thereof binding units of the formula:



wherein Y denotes an oxygen atom, an alkylidene radical having 1 to 6 carbon atoms or a cycloalkylidene radical having 3 to 6 carbon atoms, the bromine content in said copolymerized polyester being from 2 to 12% by weight, with (2) a high molecular weight organic phosphorus compound of the formula:



wherein R_1 denotes a monovalent hydrocarbon radical of 1 to 18 carbon atoms which is unsubstituted or substituted with one or more substituents, R_2 denotes a divalent hydrocarbon radical of 2 to 20 carbon atoms which is unsubstituted or substituted with one or more substituents, x and z each denote 0 or 1 and n is an integer of 5 to 100, the amount of organic phosphorus compound in said blend being such as to correspond to 0.1 to 0.8% by weight of phosphorus atoms.

5. A fireproof fibrous product obtained by mixing the fireproof polyester fibers as set forth in claim 4 with nonfusible fibers.

4,046,725

POLYURETHANES FOR ARTICLES FOR MEDICAL USAGE

Christian Pusineri, Serezin du Rhone, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Sept. 16, 1976, Ser. No. 723,975
Claims priority, application France, Sept. 22, 1975, 75.29467
Int. Cl.² C08L 5/10
U.S. Cl. 260—9 **23 Claims**

1. A polyurethane which can be used in particular for the production of articles intended to be in contact with blood, characterized in containing a macromolecular chain comprising nitrogen atoms in the form of quaternary ammonium groups, to which molecules of heparin are bonded, these nitrogen atoms originating from polymers consisting of q recurring units of the formula:

—A—NH—CO—O—B—O—CO—NH— (I)

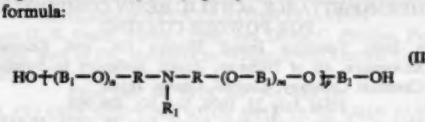
and t recurring units of the formula:

—A—NH—CO—Z—NH— (II),

these units of the formula (I) and (II) being bonded to on another, and the various symbols of these units having the following meanings:

A is a divalent organic radical consisting of a straight-chain or branched-chain alkylene radical containing from 3 to 10 carbon atoms, or a cycloalkylene radical having 5 or 6 carbon atoms in the ring or a phenylene radical which is optionally substituted by 1, 2 or 3 lower alkyl radicals (with at most 4 carbon atoms), or two alkylene or phenylene radicals linked to one another by a divalent hydrocarbon radical containing from 1 to 4 carbon atoms or by a hetero-atom chosen from amongst oxygen, sulphur and nitrogen,

B represents a divalent organic radical obtained by removing the terminal hydroxyl groups from a macrodiol of the formula:



(III)

in which:

B_1 represents a linear or branched aliphatic radical having from 2 to 12 carbon atoms,

R represents an alkylene radical of from 1 to 4 carbon atoms,

R_1 represents an alkyl radical of from 1 to 20 carbon atoms which may contain functional groups, such as, for example, aldehyde, carboxylic acid or sulphonic acid groups,

n, m and p are identical or different integers (or fractions in the case where (III) represents a mean formula) such that the molecular weight of B is between 300 and 10,000, and

q and t are such that the polyurethane, before quaternization of the nitrogen atoms, has a specific viscosity, measured at 20° C on a solution of 2 g/l in dimethyl formamide, of greater than 0.05 and preferably between 0.1 and 0.9, ratio q/t being between 0.5 and 10,

Z is a single bond or a divalent radical chosen from amongst the radicals of the formulae: —NH—NH—CO—, —NH—CH_2—CO—NH—NH—CO—, —NR_2—D—NR_3—CO—, and —O—M—O—CO—, in which

R_2 and R_3, which may be identical or different, are hydrogen atoms or lower alkyl radicals,

D is a hydrocarbon chain containing from 2 to 12 carbon atoms, or a hydrocarbon ring with 5 or 6 carbon atoms or a nitrogen-containing heterocyclic ring with 5 or 6 chain members, containing 1 or 2 nitrogen atoms, all the hydrocarbon chains and rings being saturated or unsaturated, unsubstituted or substituted by one or two lower alkyl radicals or by a nitrogen-containing heterocyclic ring with 5 or 6 chain members, which is attached by a nitrogen atom, it being possible for two of the chains or rings to be linked to one another by an alkylimino group, and

M is an aliphatic hydrocarbon radical containing from 2 to 12 carbon atoms, which is linear or branched, saturated or ethylenically unsaturated, unsubstituted or substituted by one or two lower alkyl radicals or by a dialkylamino radical, which is uninterrupted or interrupted by an alkylimino radical.

4,046,726

FLOOR FINISH COMPOSITION AND COMPONENTS THEREOF

Roger D. Meiner, Melrose Park; James M. Haines, Bolingbrook, and Henry Alsberg, Northbrook, all of Ill., assignors to The Richardson Company, Des Plaines, Ill.

Filed Dec. 22, 1975, Ser. No. 642,752
Int. Cl.² C08L 93/00
U.S. Cl. 260—27 R **12 Claims**

1. A water insoluble emulsion polymer useful for preparing a wax, alkali soluble resin and surfactant containing aqueous emulsion floor finish composition comprising the emulsion polymerization reaction product of from about 5 to about 40% by weight of alpha methylstyrene, from about 5 to about 40% by weight of styrene, and from about 20 to about 90% by weight of other copolymerizable monoethylenically unsaturated monomers, based on the combined weight of monomers charged.

4,046,727

THERMOSETTABLE ACRYLIC RESIN COMPOSITION FOR POWDER COATING

Iko Itoh; Yasuhiko Inoue; Shojiro Ito, and Kazumitsu Kawamura, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed July 23, 1974, Ser. No. 490,998
Claims priority, application Japan, July 25, 1973, 48-84350
Int. Cl.[2] C08L *33/02, 33/14, 63/08, 63/10*
U.S. Cl. 260—28.5 R 18 Claims

1. A powdered thermosettable acrylic resin composition for powder coating comprising a mixture consisting essentially of

A. 100 parts by weight of an acrylic resin having a glass transition temperature of 10° to 75° C and a weight average molecular weight of from 8,000 to 100,000, made by copolymerizing at least one nonfunctional monomer selected from the group consisting of methyl acrylate, ethyl acrylate, n-propyl acrylate, isopropyl acrylate, n-butyl acrylate, isobutyl acrylate, tert-butyl acrylate, hexyl acrylate, cyclohexyl acrylate, 2-ethylhexyl acrylate, octyl acrylate, 2-ethyloctyl acrylate, dodecyl acrylate, benzyl acrylate, phenyl acrylate, methyl methacrylate, ethyl methacrylate, n-propyl methacrylate, isopropyl methacrylate, n-butyl methacrylate, isobutyl methacrylate, tert-butyl methacrylate, hexyl methacrylate, cyclohexyl methacrylate, 2-ethylhexyl methacrylate, octyl methacrylate, 2-ethyloctyl methacrylate, dodecyl methacrylate, benzyl methacrylate, and phenyl methacrylate in an amount of about 20 to 97% by weight based on said acrylic resin with (a) at least one monomer containing an epoxy group selected from the group consisting of glycidyl acrylate, glycidyl methacrylate, β-methylglycidyl acrylate, β-methylglycidyl methacrylte, n-glycidylacrylamide, allyl glycidyl ether, and glycidyl vinylsulfonate in an amount of 2 to 28% by weight based on said acrylic resin and (b) at least one monomer containing a carboxyl group or an acid anhydride group selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, itaconic acid, fumaric acid, maleic acid, citraconic acid, monoalkyl itaconates, monoalkyl fumarates, monoalkyl maleates, monoalkyl citraconates, itaconic anhydride, maleic anhydride, and citraconic anhydride in an amount of 0.1 to 8% by weight based on said acrylic resin, wherein the gram equivalent ratio of said carboxyl groups to said epoxy groups in said acrylic resin is in the range from 1/2 to 1/20 (provided that the gram equivalent of an acid anhydride group is assumed to be equivalent to 2 gram equivalents of the carboxyl group) and

B. 0.5 to 25 parts by weight of a curing agent selected from the group consisting of polycarboxylic acids, anhydrides or polycarboxylic acids, and polycarboxylic hydrazides.

4,046,728

POLYVINYL CHLORIDE TERPOLYMER POWDER COATING COMPOSITION

Charles M. Harmuth, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 30, 1975, Ser. No. 645,388
Int. Cl.[2] C08L *23/08*
U.S. Cl. 260—28.5 A 11 Claims

1. A powder coating composition of powder particles having a particle size range of about 1–100 microns; wherein the powder particles consist essentially of a binder of a blend of:

A. 75–90% by weight of a polyvinyl chloride terpolymer consisting essentially of

1. 72–87% by weight, based on the weight of the terpolymer, of vinyl chloride,
2. 10–25% by weight, based on the weight of the terpolymer of vinyl acetate and
3. 0.1–3% by weight, based on the weight of the terpolymer, of maleic acid;

wherein the terpolymer has a weight average molecular weight of about 20,000–125,000; and

B. 10–25% by weight of a polymer consisting essentially of

1. 50–80% by weight, based on the weight of the polymer, of ethylene,
2. 15–35% by weight, based on the weight of the polymer of vinyl acetate, and
3. 5–15% by weight, based on the weight of the polymer, of carbon monoxide;

wherein the polymer has a weight average molecular weight of about 100,000–400,000;

wherein the powder particles contain in addition to the binder about 1–5% by weight of a heat stabilizer, 1–10%, by weight of a low molecular weight epoxy hydroxy polyether resin and 0.1–1% by weight of a low molecular weight polyethylene wax.

4,046,729

WATER-REDUCED URETHANE COATING COMPOSITIONS

Roger L. Scriven, and Wen-Hsuan Chang, both of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 2, 1975, Ser. No. 583,085
Int. Cl.[2] C08G *22/04;* C08K *3/18;* C08L *63/00*
U.S. Cl. 260—29.2 TN 35 Claims

1. A stable aqueous dispersion which is emulsifiable in the absence of added emulsifier of a non-gelled polyurethane formed by reacting in the presence of water:

A. a partially reacted NCO-containing polymer containing salt groups and highly active hydrogens selected from the group consisting of hydroxyl, thiol, primary and secondary amine, said partially reacted NCO-containing polymer having a reactive hydrogen equivalent weight of 150 to 10,000,

B. an active hydrogen-containing compound having at least one hydrogen more reactive with NCO groups than water to form a polyurethane having an intrinsic viscosity of less than 4.0 deciliters per gram.

4,046,730

VINYL CHLORIDE POLYMER LATEXES WITH TWO MONODISPERSE MODES

Jean-Pierre Tortai, Villers Saint-Sepulcre, France, assignor to Produits Chimiques Ugine Kuhlmann, Saint-Denis, France

Filed Sept. 4, 1975, Ser. No. 610,285
Claims priority, application France, Sept. 24, 1974, 74.32094
Int. Cl.[2] C08L *27/06*
U.S. Cl. 260—29.6 RB 6 Claims

1. A method of preparing a stable latex having two monodisperse populations of vinyl chloride polymer or copolymer particles, one population corresponding to between about 5 and 50% of the total weight of particles and having a mean particle diameter between about 0.1 and 0.5 micron, and the other population containing the remainder of the latex particles and having a mean particle diameter greater than 0.5 and less than 2 microns;

which method comprises polymerizing in aqueous emulsion, vinyl-polymerizable monomers containing at least 60% by weight vinyl chloride, and the remainder at least one monomer copolymerizable therewith in the presence of both (a) a vinyl chloride polymer or copolymer seed latex, having its particles protected by a "first" emulsifier selected from the group consisting of nonionic and anionic surfactants in an amount less than about 100% coverage of particle surfaces and (b) a "second" emulsifier selected from the same group as specified for the "first" emulsifier whose chemical composition is different from that used as the "first" emulsifier.

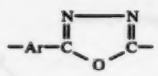
4,046,731

PROCESS FOR PREPARING DOPES FROM WHICH SHAPED ARTICLES OF OXADIAZOLE/N-ALKYLHYDRAZIDE COPOLYMERS ARE OBTAINED

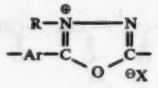
George A. Mortimer; Chris A. Pelezo, both of Pensacola, and John C. Richardson, Cantonment, all of Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed May 13, 1976, Ser. No. 686,207
Int. Cl.² C08K 3/30; C08K 3/52, 5/42
U.S. Cl. 260—30.6 R 8 Claims

1. A process for preparing a dope comprising an acid and a copolymer consisting essentially of recurring units (I) of the formula

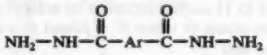


and recurring units (II) of the formula

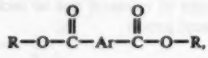


wherein the mole ratio of units I and II is between 20:80 and 95:5, consisting of

a. combining and mixing (i) a slurry of monomers consisting essentially of one or more dihydrazides in particulate form of the formula



in one or more diesters in the liquid state of the formula



wherein the mole ratio of dihydrazide to diester is between about 1:1 and about 2:1, and (ii) and acid selected from the group consisting of oleum, chlorosulfonic acid, polyphosphoric acid, and mixtures thereof, whereby a monomer solution is formed, and then

b. maintaining said monomer solution for a period of time at a temperature sufficient to polymerize said monomers, thereby obtaining a dope comprising said fiber-forming copolymer in said acid,

wherein Ar represents a divalent aromatic radical, R represents a C_1 to C_4 alkyl, and $-X$ represents an anion present in said acid.

4,046,732

DISPERSANT FOR THE APPLICATION OF DENTAL CERAMIC

Samuel J. Infante, 1 Rosedale Terrace, Livingston, N.J. 07039

Filed Jan. 9, 1975, Ser. No. 539,916
Int. Cl.² C08J 5/02, 5/10, 5/32, 33/12
U.S. Cl. 260—31.2 R 1 Claim

1. A dispersant for the application of ceramic opaque to a substrate consisting by volume essentially of

a. 1.0 parts polymethylmethacrylate,
b. 0.5 to 4.5 parts monomethylmethacrylate,
c. 1.0 to 4.5 parts ethylacetate,
d. 1.0 to 4.5 parts trichloroethane, and
e. 10.0 to 25.0 parts nitroethane.

4,046,733

SULFONIC ACID COMPOSITION FOR FORMING THERMOPARTICULATING COATING

James D. B. Smith, Turtle Creek, and David C. Phillips, Penn Hills, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 30, 1975, Ser. No. 645,164
Int. Cl.² C08K 5/01; C08L 63/00; G01K 13/02; G01N 31/00
U.S. Cl. 260—33.6 EP 16 Claims

1. A composition comprising

1. a thermoparticulating compound selected from the group consisting of sulfonic acids, amine salts of sulfonic acids, and mixtures thereof; and
2. a solution of a resinous carrier curable at room temperature, stable at 60° C, and unreactive with said thermoparticulating compound.

4,046,734

PROCESS FOR THE MANUFACTURE OF AMINOPLAST AND PHENOPLAST MOULDING COMPOSITIONS USING A THIN LAYER EVAPORATOR OR A ROLLER DRIER

Willi Zimmerli, Ollon, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,106
Claims priority, application Switzerland, Nov. 5, 1973, 15560/73
Int. Cl.² C08J 3/14
U.S. Cl. 260—38 6 Claims

1. An improved process for the manufacture of aminoplast or phenoplast compositions by drying an aqueous solution, which optionally contains pigments or mineral fillers, of a phenol-formaldehyde resin, a urea-formaldehyde resin, a melamine-formaldehyde resin or a phenol-modified melamine-formaldehyde resin, grinding the resin composition, optionally mixing it with a filler, pigment, lubricant and, if desired, other additives, and warm-densifying the mixture wherein the improvement comprises

passing the aqueous resin solution into a thin layer evaporator or roller drier,

distilling off the water at an elevated temperature, and

withdrawing the dried material in a fused or solid form.

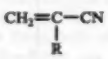
4,046,735

STABILIZERS OF NITRILE POLYMERS USING TRIAZINE DERIVATIVES

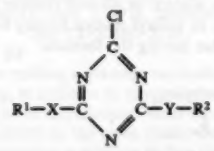
Alva F. Harris, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Sept. 2, 1976, Ser. No. 719,806
Int. Cl.² C08K 5/34
U.S. Cl. 260—45.8 NT 10 Claims

1. A nitrile polymer composition stable toward thermal discoloration which comprises a polymer of at least 40% by weight of a nitrile monomer having the formula:



wherein R is hydrogen, lower alkyl having from 1 to 4 carbon atoms or halogen and an effective amount of a stabilizing agent having the formula:



wherein R^1 and R^2 each independently represent an alkyl group having 1 to 8 carbon atoms or an aryl group having 6 to 20 carbons; and X and Y each represent O, S, NH or NR^3 wherein each R^3 independently represents H, an alkyl group of 1 to 8 carbon atoms or an aryl group of 6 to 20 carbon atoms with the proviso that R^1 and R^2 may be H when X and/or Y is NH, NR^3 or S.

4,046,736

1,3-BIS[(2,2,6,6-TETRAALKYL-4-PIPERIDYLIDENE)AMINO]GUANIDINES AS LIGHT STABILIZERS FOR POLYOLEFINS

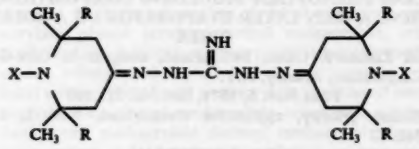
William Baptist Hardy, Bound Brook, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 16, 1976, Ser. No. 715,019

Int. Cl.² C07D *401/12*

U.S. Cl. 260—45.8 N **13 Claims**

1. A compound of the formula:



wherein X is —H, —OH, —O., alkyl of 1 to 8 carbon atoms, or carboxylic acyl of 2 to 10 carbon atoms, and R is alkyl of 1 to 8 carbon atoms.

9. A polyolefin stabilized against degradation by ultraviolet light by an effective amount of a compound of claim **1.**

4,046,737

PIPERIDINE DERIVATIVES

Brian Holt, Royton, and Donald Richard Randell, Stockport, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 310,031, Nov. 28, 1972, abandoned. This application May 14, 1975, Ser. No. 577,501

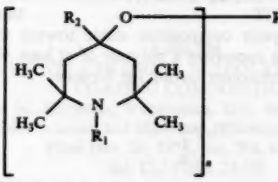
Claims priority, application United Kingdom, June 17, 1972, 28458/72; Nov. 30, 1971, 55487/71; July 28, 1972, 35473/72

Int. Cl.² C08K *5/00*

U.S. Cl. 260—45.8 N **16 Claims**

1. A composition comprising an organic material and 0.01% to 5% by weight of a stabilizer having the formula

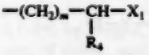
I



and their salts

wherein *n* is 1, 2, 3 or 4;

R_1 is a monovalent residue and is an alkyl residue from 1 to 20 carbon atoms, an alkenyl or alkynyl residue having from 3 to 20 carbon atoms, an aralkyl residue having from 7 to 12 crbon atoms, or a residue having the formula:

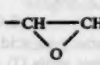


or

-continued

wherein *m* is 1, 2 or 3,

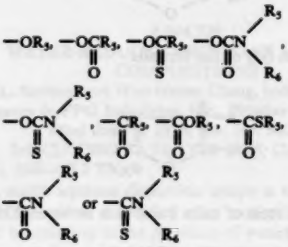
R_4 is a hydrogen, methyl or phenyl residue, X_2 is halogen, cyano,



—COR_5, —C0.0R_5, —CO.SR_5—,

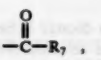
or —$CONR_5R_6$ and

X_1 is hydroxyl, halogen, cyano,



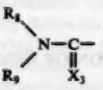
where R_5 is an alkyl residue having from 1 to 20 carbon atoms, an alkenyl residue having from 2 to 20 carbon atoms, a cycloalkyl residue having from 5 to 12 carbon atoms, an aryl residue having from 6 to 11 carbon atoms or an aralkyl residue having 7 to 14 carbon atoms or when R_5 is joined to a nitrogen atom, also hydrogen and

R_6 is hydrogen or an alkyl residue having from 1 to 4 carbon atoms, or R_5 and R_6 together with the nitrogen atom to which they are bound form a 5- or 6-membered ring which contains no other hetroatoms or contains one or more other heteroatoms, or R_1 is an acyl group



where R_7 is hydrogen, an unsubstituted aliphatic or substituted aliphatic residue having from 1 to 20 carbon atoms, an alkenyl or alkynyl residue having from 2 to 20 carbon atoms, a cycloaliphatic residue having from 5 to 12 carbon atoms, an araliphatic residue having from 7 to 14 carbon atoms, an aromatic residue having from 6 to 20 carbon atoms or an heterocyclic residue, or

R_1 is a carbamoyl or thiocarbamoyl residue having the formula:



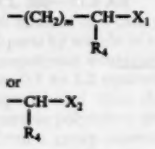
wherein X_3 is —O— or —S—,

R_8 is hydrogen or an alkyl residue having from 1 to 4 carbon atoms, and

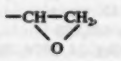
R_9 is hydrogen, an alkyl residue having from 1 to 20 carbon atoms, an alkenyl residue having from 3 to 20 carbon atoms, a cycloalkyl residue having from 5 to 12 carbon atoms or an unsubstituted aryl or substituted aryl residue having from 6 to 12 carbon atoms;

R_2 is an alkyl residue having from 1 to 4 carbon atoms, an alkenyl or alkynyl residue having 3 to 20 carbon atoms, a

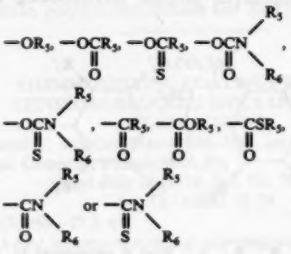
cycloalkyl residue having from 5 to 12 carbon atoms, an aryl residue having from 6 to 11 carbon atoms or an aralkyl residue having from 7 to 9 carbon atoms or hydrogen; and
when n is 1, R_3 is a monovalent residue and is an alkyl residue having from 1 to 20 carbon atoms, a cycloalkyl residue having from 5 to 12 carbon atoms, an alkenyl or alkynyl residue hving from 3 to 20 carbon atoms, an aralkyl residue having from 7 to 12 carbon atoms, or a residue having the formula:



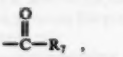
wherein m is 1, 2 or 3,
R_4 is a hydrogen, methyl or phenyl residue,
X_2 is halogen, cyano,



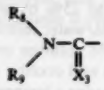
$—COR_5$, $—CO.OR_5$, $—CO.SR_5$, or $CONR_5R_6$
and
X_1 is hydroxyl, halogen, cyano,



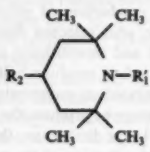
wherein R_5 is an alkyl residue having from 1 to 20 carbon atoms, an alkenyl residue having from 2 to 20 carbon atoms, a cycloalkyl residue having from 5 to 12 carbon atoms, an aryl residue having from 6 to 11 carbon atoms or an aralkyl residue having 7 to 14 carbon atoms, or when
R_5 is joined to a nitrogen atom, also hydrogen and
R_6 is hydrogen or an alkyl residue having from 1 to 4 carbon atoms, or
R_5 and R_6 together with the nitrogen atom to which they are bound form a 5- or 6-membered ring which contains no other heteroatoms or contains one or more other heteroatoms, or
R_3 is an acyl group,



wherein R_7 is hydrogen, an unsubstituted aliphatic or substitued aliphatic residue having from 1 to 20 carbon atoms, an alkenyl or alkynyl residue hving from 2 to 20 carbon atoms, a cycloaliphatic residue having from 5 to 12 carbon atoms, an araliphatic residue having from 7 to 14 carbon atoms, an aromatic residue having from 6 to 20 carbon atoms or an heterocyclic residue, or
R_3 is a carbamoyl or thiocarbamoyl residue having the formula:



wherein X_3 is —O— or —S—,
R_8 is hydrogen or an alkyl residue having from 1 to 4 carbon atoms, and
R_9 is hydrogen, an alkyl residue having from 1 to 20 carbon atoms, an alkenyl residue having from 3 to 20 carbon atoms, a cycloalkyl residue having from 5 to 12 carbon atoms or an unsubstituted aryl or substituted aryl residue having from 6 to 12 carbon atoms; or
R_3 represents a monovalent group obtained by removing a hydroxyl group from a sulphinic acid, a sulphonic acid, a phosphorus containing acid or a boric acid, or
R_3 is an aryl residue or a residue having the formula:



wherein R_1' is hydrogen or R_1' has the same significance as R_1:
when n is 2, R_3 is a divalent residue and is an aklkylene residue having from 1 to 20 carbon atoms, an alkenylene residue having from 2 to 20 carbon atoms, an alkynylene residue having from 2 to 20 carbon atoms, a cycloalkyliden residue having from 5 to 12 carbon atoms, an arylene residue having 6 to 14 carbon atoms, an aralylene residue having from 8 to 14 carbon atoms or an aliphatic, aromatic or heterocyclic diacyl residue, the group —Co— or —CO.CO—, an aliphatic or aromatic dicabamoyl or dithiocarbamoyl, sulphinyl or sulponyl residue or a divalent residue obtained by removing two hydroxyl groups from a disulphonic acid, a phosphorus containing acid or a boric acid;
when n is 3, R_3 is a trivalent residue and is an alkanetriyl, an arenetriyl or an arenetriyl-trialkylene residue, an aliphatic or aromatic triacyl residue or a triacyl residue derived from o-phosphoric, o-phosphorous or o-boric and
when n is 4, R_3 is a tetravalent residue and is an alkanetetrayl residue or a tetraacyl residue derived from an aliphatic or aromatic tetracarboxylic acid or from o-silicic acid as well as, when n is 2, 3 or 4, partial ethers, esters and carbamoyloxy and thiocarbamoyloxy compounds related to the fully reacted compounds of formula I; provided that when a compound of formula I is an ester, the alkyl group of R_1 has only 5 to 20 carbon atoms.

4,046,738

PROCESS FOR THE MANUFACTURE OF GRANULAR OXYMETHYLENE POLYMERS

Gunter Sextro; Karlheinz Burg, both of Naurod, Taunus; Hans Joachim Leugering, Frankfurt am Main; Helmut Schlaf, Fischbach, Taunus, and Alwin Heller, Erzhausen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Nov. 5, 1975, Ser. No. 629,628

Claims priority, application Germany, Nov. 7, 1974, 2452737; Feb. 4, 1975, 2504482; Mar. 7, 1975, 2509924

Int. Cl.[2] C08G 2/28

U.S. Cl. 260—67 FP **14 Claims**

1. A process for making a granular oxymethylene copolymer (POM) containing, in addition to oxymethylene units, from 0.1 to 20% by weight of oxyalkylene units having from 2 to 8 adjacent carbon atoms in the main chain thereof, which process comprises preparing a solution or fine dispersion of POM in a methanol/water mixture at a temperature of 5° to 65° C.

above the sintering temperature (T_s) of the POM, preparing a cooling agent which is a suspension of 1 to 25% by weight POM in 99 to 75% by weight of a methanol/water mixture at a temperature below T_p, cooling said POM solution or fine dispersion in a first stage by mixing it with said cooling agent in such proportions as to produce a blend having a temperature of 0° to 10° C. above T_p, thereafter cooling said blend in a second stage to a temperature of 1° to 10° C. below T_p, separating the granular POM from the blend and drying it.

4,046,739

PROCESS FOR REDUCING THE PROCESSING TIME IN THE PRODUCTION OF POLYESTERS

Joseph Lacona, Canonsburg, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,770
Int. Cl.² C08G 63/52, 63/16
U.S. Cl. 260—75 M 9 Claims

1. In a two-stage process for the production of polyesters wherein an aromatic polycarboxylic acid selected from the group consisting of isophthalic acid and terephthalic acid is reacted in the first stage with a polyol to produce half-ester mixture which is reacted with a saturated or unsaturated aliphatic polycarboxylic in the second stage to produce the polyester, to reduce the processing time in the first stage; thereby reducing the processing time for the production of the polyester, comprising:

a. contacting first portion of the polyol with the aromatic polycarboxylic acid in the first stage in an amount at least sufficient to form an agitatable mixture with the aromatic polycarboxylic acid but in an amount slightly less than the theoretical amount of polyol needed to react with the isophthalic acid or terephthalic acid and saturated or unsaturated aliphatic polycarboxylic acid,

b. heating the agitatable mixture to a temperature of at least 190° C to 230° C, and

c. adding the remaining portion of the polyol to the heated agitatable mixture in the first stage in such a manner that the temperature of the heated agitatable mixture is maintained at a temperature of at least 190° C in order to produce a half-ester mixture.

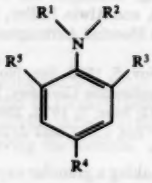
4,046,740

NOVEL POLYESTER COMPOSITIONS

Peter Robert Thornburrow, South Glamorgan, Wales, assignor to BP Chemicals Limited, London, England

Filed Apr. 20, 1976, Ser. No. 678,701
Claims priority, application United Kingdom, May 1, 1975, 18198/75
Int. Cl.² C08G 63/12; C08L 67/06
U.S. Cl. 260—75 N 5 Claims

1. An unsaturated polyester resin composition which comprises an unsaturated polyester, a soluble cobalt salt, an amine accelerator having the formula



where R^1, R^2 are selected from the radicals alkyl, hydroxyalkyl and carboxy alkyl groups and R^3, R^4 and R^5 are selected from the radicals alkyl, aralkyl, cycloalkyl, alkoxy and halogen groups, and a peroxy initiator that is accelerated by said amine.

4,046,741

POST-TREATMENT OF POLYUREA MICROCAPSULES

Herbert B. Scher, Moraga, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Feb. 17, 1976, Ser. No. 658,212
Int. Cl.² C08G 18/82; B01J 13/02; B05D 7/24
U.S. Cl. 260—77.5 A 9 Claims

1. Method of reducing residual isocyanate level in polyurea microcapsules comprising post-treatment of said polyurea microcapsules with an excess of ammonia or an amine.

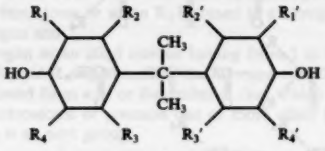
4,046,742

COMPOSITIONS CONTAINING HYDROXYL GROUPS AND THEIR USE FOR THE PRODUCTION OF FLAMEPROOF PLASTICS

Erich Eimers; Rolf Dhein, both of Krefeld-Bockum, and Rolf Wiedermann, Bergisch-Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

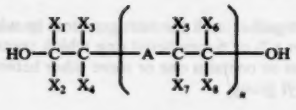
Filed Oct. 8, 1975, Ser. No. 620,725
Claims priority, application Germany, Oct. 24, 1974, 2450540
Int. Cl.² C08G 18/42, 18/14; C09K 3/28
U.S. Cl. 260—77.5 AN 6 Claims

1. A composition containing hydroxyl groups which has an acid number of less than 1 and a hydroxyl number in the range from 150 to 300 obtained by mixing 25 to 75% by weight of a halogenated 2,2-diphenylol propane corresponding to the general formula



in which

R_1, R_2, R_3, R_4, R_1', R_2', R_3', Rhd 4' represents H, C_1–C_4-alkyl, or halogen, at least 1 R = halogen, with 75 to 25% by weight of a polyester containing hydroxyl groups, obtained from saturated, unsaturated or halogenated aliphatic and/or cycloaliphatic and/or aromatic polycarboxylic acids, and a molar excess of dialcohols corresponding to the following formula



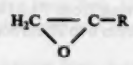
in which

X_1 to X_8 = H, or C_1–C_4-alkyl,

n = 1 - 10,

A = O or S

and by subsequently alkoxylating in the presence of alkaline reacting substances the aforementioned mixture with the alkylene oxide corresponding to the formula



in which R = H, CH_3, CH_2OH, CH_2Cl, CH_2Br, C_2H_5.

4,046,743

CATALYSIS OF AMINE CURABLE POLYMERS BY HIGH DIELECTRIC CONSTANT COMPOUNDS

Steven Edward Schonfeld, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 496,504, Aug. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 476,369, June 5, 1974, abandoned. This application July 21, 1975, Ser. No. 597,808

Int. Cl.[2] C08G *18/18*

U.S. Cl. 260—77.5 AB 11 Claims

1. A mixture of a catalyst curable polymer, comprising,

100 parts by weight of an amine curable urethane polymer or prepolymer containing free isocyanate groups,

from 0.8 to 1.2 equivalents of an amine containing curing agent based upon the free active groups of said amine curable polymer or prepolymer, said curing agent selected from a group consisting of a complex of 4,4′-methylene dianiline and a salt, said salt selected from the group consisting of sodium chloride, sodium bromide, sodium iodide, sodium nitrate, lithium chloride, lithium bromide, lithium iodide, lithium nitrate and sodium cyanide, and a complex of racemic 2,3-di(4-aminophenyl) butane and a salt, said salt selected from the group consisting of sodium chloride, sodium bromide, sodium iodide, potassium chloride, potassium bromide, potassium iodide, rubidium chloride, rubidium bromide, rubidium iodide, cesium chloride, cesium bromide and cesium iodide, the ratio of said dianiline or said butane to said salt in said complex being about 3 moles per 1 mole, and

from 0.1 to about 35 parts of a curing agent catalyst having a high dielectric constant selected from the class consisting of oleic acid, benzaldehyde, adiponitrile, acetic anhydride, polydimethylsiloxane and diethyl sulfate.

4,046,744

THERMOSETTING COATINGS BASED ON KETOXIME-BLOCKED ISOCYANATES AND OXAZOLIDINES

Raymond F. Jenkins, Masonville, N.J., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed July 28, 1976, Ser. No. 709,570

Int. Cl.[2] C08G *18/06*

U.S. Cl. 260—77.5 AQ 18 Claims

1. A low temperature curing, one-component thermosetting coating composition comprising an oxime-blocked polyisocyanate and an oxazolidine, said oxazolidine being hydrolyzable by moisture at a temperature of between about 125° F. and 325° F. the hydrolysis product of which can react with a polyisocyanate, to produce a polymeric product.

4,046,745

PREPARATION OF FUNCTIONAL POLYMERS

Charles M. Selman, and Carl A. Uraneck, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

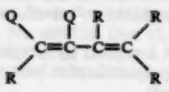
Division of Ser. No. 625,743, Oct. 24, 1975, Pat. No. 3,993,853. This application May 27, 1976, Ser. No. 690,805

Int. Cl.[2] C08F *4/48, 8/00;* C08E *8/08*

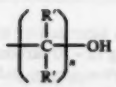
U.S. Cl. 260—77.5 CR 23 Claims

1. A process for preparing a cured polymer which comprises the steps of:

a. copolymerizing at least one conjugated diene, or at least one conjugated diene with at least one monovinyl-substituted aromatic hydrocarbon, with a minor effective amount for a lithium salt of a monohydroxyalkyl-substituted conjugated alkadiene as comonomer, under solution polymerization conditions of temperature and pressure and employing an effective amount of a lithium-based initiator, thereby preparing a copolymer, wherein said lithium salt of a monohydroxyalkyl-substituted conjugated alkadiene represents the reaction product of a monohydroxyalkyl-substituted conjugated alkadiene with lithium or with a hydrocarbyllithium compound, and wherein said monohydroxyalkyl-substituted conjugated alkadiene is represented by the formula



wherein Q is R or a mononydroxyalkyl group represented by



wherein each R is hydrogen or is an alkyl, cycloalkyl, aryl, or combination radical; each R′ is hydrogen, methyl, or ethyl; *n* is an integer of 1 to 3; such that said monohydroxyalkyl-substituted conjugated alkadiene contains 1 hydroxyalkyl group per molecule;

b. treating said copolymer from said step (a) with an effective amount of an alkylene oxide; and

c. curing the alkylene oxide-treated copolymer with a polyisocyanate curing system.

4,046,746

METHOD FOR EXTRACTING GRANULAR POLYAMIDES AND FOR PREPARING POLYAMIDE POWDERS

Srinivasan Sridhar, and Horst Hedden, Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed June 30, 1975, Ser. No. 592,036

Claims priority, application Germany, July 19, 1974, 2434755; July 19, 1974, 2434756

Int. Cl.[2] C08G *69/46*

U.S. Cl. 260—78 S 7 Claims

1. A method for preparing powdered polycarbonamide having at least 10 aliphatically bound carbon atoms per carbonamide group or mixed polycarbonamide containing at least 70 percent by weight of said polycarbonamide as constituents consisting of essentially:

a. extracting said polycarbonamide in granular form with dimethyl formamide at a temperature of about 70° to 100° C, to remove the monomerous and low molecular ingredients;

b. separating the extracted polycarbonamide in granular form from the dimethyl formamide residue;

c. dissolving the separated and extracted polycarbonamide in dimethyl formamide at a temperature between about 140° and 150° C to form a solution; and

d. precipitating said powdered polycarbonamide by cooling said solution.

4,046,747

ADDITIVE FOR IMPROVING THE ADHESION TO TEXTILES OF HOT MELT ADHESIVES BASED ON COPOLYAMIDES

Anton Capelle, Delden, Netherlands, and Heinz Scholten, Lippramsdorf, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Sept. 29, 1975, Ser. No. 617,440

Claims priority, application Germany, Oct. 10, 1974, 2448344

Int. Cl.[2] C08L *77/02*

U.S. Cl. 260—78 S 4 Claims

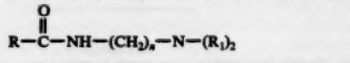
1. A polyamide adhesive composition consisting essentially of:

A. about 96 to 99.9 by weight of a solid copolyamide of an aliphatic dicarboxylic acid, cyclic dicarboxylic acid each

having 4–12 carbon atoms or mixtures thereof or said dicarboxylic acids and an equivalent amount of aliphatic diamine, cyclic diamine each having 4 – 15 carbon atoms or mixtures thereof or aminocarboxylic acid having 4–16 carbon atoms or mixtures thereof; and

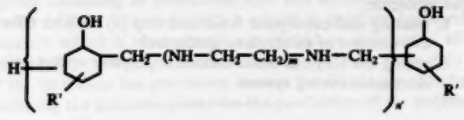
B. an additive of

a. about 0.05 – 2 percent by weight based on the total weight of copolyamide of at least one acid amide of the general formula



wherein R represents a saturated or unsaturated aliphatic hydrocarbon group having 12 – 20 carbon atoms, R_1 represents an alkyl group of 1 – 3 carbon atoms, and n represents an integer of between 3 and 6; and

(b) about 0.05 – 2 percent by weight of a mixture of differently condensed aminoalkyl phenols of the general formula



wherein n′ has the value of 0.5 – 2,

m has the value of 2 – 6, and

R′ represents an aliphatic hydrocarbon group having 8–10 carbon atoms which is in the ortho- or para-position with respect to the OH-group.

4,046,748

POLYMERS OF TERPENE-MALEIC ANHYDRIDE ADDUCTS WITH ALIPHATIC DIAMINES

Robert William Schluenz, and Curry Beach Davis, both of Panama City, Fla., assignors to Arizona Chemical Company, Wayne, N.J.

Filed Apr. 19, 1976, Ser. No. 678,082

Int. Cl.[2] C08G *67/04*; C08F *236/00*; C08L *11/00*

U.S. Cl. 260—78 UA **2 Claims**

1. A resinous terpene maleimide prepared by reacting in equimolar amounts of aliphatic diamine and a mixture prepared by reacting at temperatures between 140° C. and 200° C. substantially equimolar amounts of (a) a non-conjugated terpene or mixed non-conjugated terpenes and (b) maleic acid anhydride in the presence of from 0.002% to 0.03% iodine, based on the weight of the terpene, and recovering a mixture of less than 85% mono-adduct and more than 15% di-adduct of terpene-maleic adducts.

4,046,749

PHENYLENE SULFIDE OLIGOMER PRODUCTION

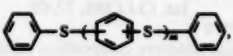
Richard T. Hawkins, Orem, Utah, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 15, 1975, Ser. No. 613,669

Int. Cl.[2] C08F *28/00*; C08G *75/06*

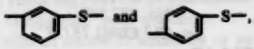
U.S. Cl. 260—79 **17 Claims**

1. A process for the production of phenylene sulfide oligomers which comprises heating at least one aromatic sulfide having the formula

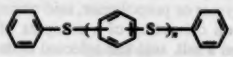


where *m* is an integer of 1, 2, or 3 and where the structure of each

is selected from

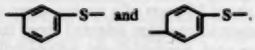


in an atmosphere of an oxygen-containing gas and at an elevated temperature and for a period of time sufficient to form a phenylene sulfide oligomer represented by the formula



where *n* is an integer of 2 to about 12 and where the structure of each

is selected from



4,046,750

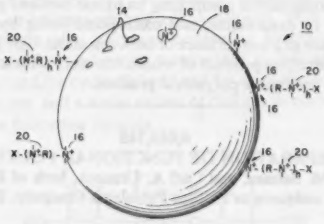
IONENE MODIFIED SMALL POLYMERIC BEADS

Alan Rembaum, Altadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

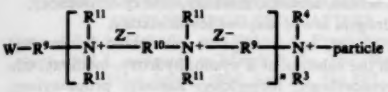
Filed Sept. 30, 1974, Ser. No. 510,786

Int. Cl.[2] C08F *8/30*

U.S. Cl. 526—310 **8 Claims**



1. A composition of matter comprising: small, synthetic, organic, polymeric spherical particles having a diameter from 100 A. to 100 microns which are the cross-linked, addition polymerization product of a mono-unsaturated, acrylic monomer substituted with ionene reactive chloro, bromo, iodo or tertiary amine sites with 0.1 to 30% by weight of a diene or triene capable of addition polymerization with the unsaturated group of the acrylic monomer and having covalently bonded to at least one of said sites linear, polyquaternary ionene segments having an average charge of at least one intrapolymeric quaternary nitrogen for an average of every twelve chain atoms such that the halogen content of the segments is from 1 meg to 30 meg per gram of particle to form a particle of the structure:



where R^{11} is methyl, R^9 and R^{10} are divalent aliphatic, aromatic or heterocyclic groups containing at least 3 carbon atoms, or R^9 combined with R^{11} form a cyclic group, W is chloro, bromo, or iodo and n is an integer.

4,046,751

SUBSTITUTED PHENYL KETONES

Cedric Herbert Hassall, Welwyn; William Henry Johnson, Hitchin; Antonin Krohn, London; Carey Ernest Smithen, Welwyn, and William Anthony Thomas, Huntingdon, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

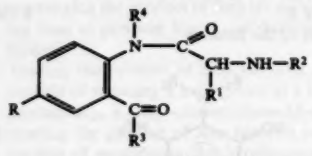
Division of Ser. No. 605,580, Aug. 18, 1975, Pat. No. 4,007,219. This application Nov. 11, 1976, Ser. No. 741,084

Claims priority, application United Kingdom, Aug. 20, 1974, 36567/74; May 21, 1975, 21821/75; Aug. 11, 1975, 36567/75

Int. Cl.[2] C07D *213/51;* A61K *31/44*

U.S. Cl. 260—112.5 R 1 Claim

1. A compound of the general formula



wherein R is selected from the group consisting of a halogen atom, nitro and a trifluoromethyl group; R^1 is a hydrogen atom or a lower alkyl group; R^2 is an acyl group derived from a naturally occurring amino acid; R^3 is a 2-pyridyl group; and R^4 is selected from the group consisting of a hydrogen atom, a methyl, cyclopropylmethyl, di(C_{1-4}alkyl) aminoethyl, methoxymethyl and a hydroxyethyl group or the acid addition salts thereof.

4,046,752

PROCESS FOR PREPARING AN AZO COMPOUND FROM A 2-AMINOTHIAZOLE DIAZO COMPONENT

Kurt Hohmann, Neu-Isenburg; Reinhard Mohr, Offenbach, Main, and Manfred Hahnke, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 8, 1975, Ser. No. 594,111

Claims priority, application Germany, July 11, 1974, 2433229

Int. Cl.[2] C09B *29/36*

U.S. Cl. 260—158 3 Claims

1. In a process for the preparation of a pure thiazolazo compound wherein a 2-aminothiazole is used as a diazo component which comprises diazotizing a synthetized 2-aminothiazole and coupling it with a coupling component to yield the azo compound, the improvement consisting of using the 2-aminothiazole in the diazotization process directly after its synthesis without intermediate isolation from its preparation reaction mixture.

4,046,753

SUBSTITUTED 2-PHENYLHYDRAZINO AND 2-PHENYLAZO THIAZOLINES

Michael H. Fisher, Somerville, and Mu Tsu Wu, Clark, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 405,714, Oct. 11, 1973, abandoned. This application Oct. 2, 1975, Ser. No. 619,000

Int. Cl.[2] C07C *107/04;* C07D *277/04, 277/08, 277/38*

U.S. Cl. 260—158 7 Claims

1. The compound which is 2-phenylazo-2-thiazoline.

4,046,754

WATER-SOLUBLE NAPHYHYL-AZO-PYRAZOLONE FIBER REACTIVE DYESTUFFS

Fritz Meininger, and Hartmut Springer, both of Frankfurt am Main, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

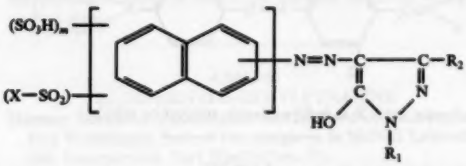
Continuation-in-part of Ser. No. 449,517, March 8, 1974, abandoned, which is a continuation of Ser. No. 261,925, June 12, 1972, abandoned, which is a division of Ser. No. 66,552, Aug. 24, 1970, abandoned. This application Oct. 17, 1975, Ser. No. 623,339

Claims priority, application Germany, Mar. 11, 1971, 1943904

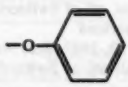
Int. Cl.[2] C09B *29/38, 43/18*

U.S. Cl. 260—162 7 Claims

1. A water-soluble monoazo dyestuff having in the form of the free acid the formula



wherein X is $-CH=CH_2$ or $-CH_2-CH_2-Z$ in which is $-OH$, $-Cl$, $-Br$, $-OSO_3H$, $-SSO_3H$, $-OPO_3H_2$,



or $-N$(lower alkyl)$_2$, R_1 is phenyl or naphthyl substituted by at least one member of the group sulfo and halo, R_2 is lower alkyl, carboxyl or carboxylic acid lower alkylester and m is 1 or 2.

4,046,755

DISAZO PIGMENTS CONTAINING NAPHTHALENE COUPLING COMPONENTS

Rudolf Mory, Dornach, and Rolf Muller, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

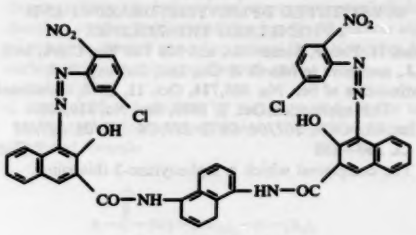
Continuation-in-part of Ser. No. 314,282, Dec. 12, 1972, abandoned. This application Aug. 14, 1975, Ser. No. 604,525

Claims priority, application Switzerland, Dec. 31, 1971, 18188/71

Int. Cl.[2] C09B *43/12, 33/14*

U.S. Cl. 260—174 1 Claim

1. A compound of the formula



4,046,756

2,5-DIHALO-4-DIALKYLSULFAMOYL 4'-(N-CYANOALKYL-N-ALKYL-AMINO)-1,1'-AZOBENZENE DISPERSE DYES

Piero Maderni, and Curt Mueller, both of Binningen, Bl, Switzerland, assignors to Sandoz Ltd., Basle, Switzerland

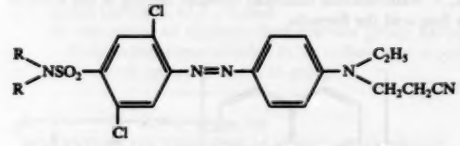
Continuation of Ser. No. 17,916, March 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 673,921, Oct. 9, 1967, abandoned. This application May 30, 1975, Ser. No. 582,081

Claims priority, application Switzerland, Oct. 10, 1966, 16198/66; Oct. 29, 1966, 17094/66

Int. Cl.[2] C09B *29/08*

U.S. Cl. 260—205 4 Claims

1. A of the formula



wherein each R is independently methyl or ethyl.

4,046,757

2-OPTIONALLY SUBSTITUTED ALKYL-AND PHENYLSULFONYLPHENYL-AZO-PHENYL DYES AND A PROCESS FOR THEIR SYNTHESIS

Jacques Meybeck; Curt Mueller, both of Binningen, and Fred Mueller, Munchenstein, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

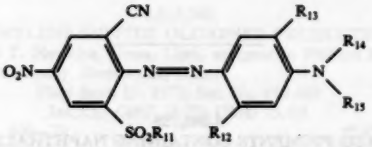
Filed Sept. 23, 1969, Ser. No. 860,403

Claims priority, application Switzerland, Oct. 18, 1968, 15612/68

Int. Cl.[2] C09B *43/02*

U.S. Cl. 260—207 26 Claims

1. A compound of the formula



wherein

R_{11} is phenyl or substituted phenyl, wherein each substituent of substituted phenyl is independently fluoro, chloro, bromo, iodo, hydroxy, methyl, amino, methylamino, nitro or acetamido,

R_{12} is hydrogen, lower alkyl, formamido, lower alkylcarbonylamino, substituted lower alkylcarbonylamino, methoxycarbonylamino, ethoxycarbonylamino, benzamido, methylsulfonylamino or ethylsulfonylamino, wherein the substituent of substituted lower alkylcarbonylamino is chloro, bromo, acetoxy, methoxy, ethoxy or phenoxy,

R_{13} is hydrogen, lower alkyl or lower alkoxy,

R_{14} is hydrogen, lower alkyl or substituted lower alkyl wherein the substituent is cyano, hydroxy, methoxy, ethoxy, cyanoethoxy, formyloxy, acetoxy, propionyloxy, methoxycarbonyl, ethoxycarbonyl, methoxycarbonyloxy, ethoxycarbonyloxy, acetoxyethoxy or phenyl, and

R_{15} is hydrogen, lower alkyl or substituted lower alkyl wherein the substituent is hydroxy, methoxy, ethoxy, cyanoethoxy, phenoxy, phenyl, methylamino, ethylamino, formyloxy, acetoxy, propionyloxy, benzoyloxy, methoxycarbonyl, ethoxycarbonyl, phenoxycarbonyl, methoxycarbonyloxy, ethoxycarbonyloxy, phenoxycarbonyloxy, methoxyethoxycarbonyl, 1,1-dimethylhydrazinium A^-, trimethylammonium A^-, or triethylammonium A^-, wherein A^- is an anion.

4,046,758

3-HALO-2,6-DINITRO-4-TRIFLUOROMETHYLANILINES

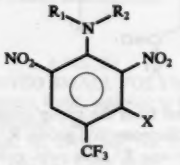
William G. Woods, Fullerton, and Don L. Hunter, Anaheim, both of Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Division of Ser. No. 448,322, March 5, 1974, Pat. No. 3,966,816, which is a continuation-in-part of Ser. No. 878,262, Nov. 19, 1969, abandoned. This application Jan. 28, 1976, Ser. No. 653,182

Int. Cl.[2] C07D *295/06*; A01N *9/22*

U.S. Cl. 260—239 E 5 Claims

1. A compound of the formula



in which R_1 and R_2 are combined to form an alkylene group having 2 to 6 carbon atoms in the chain and X is halogen.

5. A compound according to claim 1, which is N,N-pentamethylene-3-chloro-2,6-dinitro-4-trifluoromethylaniline.

4,046,759

PENICILLIN ESTERS

Toshiyasu Ishimaru, D-14, 2-7, Momoyamadai, Suite, Japan

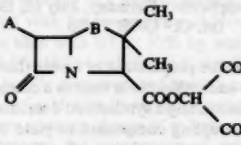
Filed Aug. 25, 1975, Ser. No. 607,362

Claims priority, application Japan, Aug. 29, 1974, 49-99580; Oct. 18, 1974, 49-120488; Apr. 14, 1975, 50-45448; June 6, 1975, 50-68879

Int. Cl.[2] C07D *499/58, 499/44*

U.S. Cl. 260—239.1 9 Claims

1. A penicillin ester having the formula:



wherein A is a conventional penicillin acylamino group;

B is =S or =S—O; and

R_1 is methyl, methoxy or ethoxy.

4,046,760

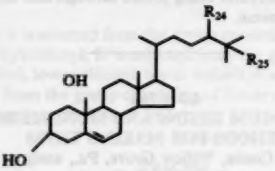
PROCESS FOR PREPARING 1-α-HYDROXY CHOLESTEROL DERIVATIVES

Howard Jones, Holmdel, and Robert A. Frankshun, Plainfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed July 1, 1976, Ser. No. 701,917
Int. Cl.² C07J 21/00
U.S. Cl. 260—239.55 R 6 Claims

1. A process for the preparation of a 1α-hydroxycholes-5-enol of the formula:

VI



wherein R_{24} is a member selected from the group consisting of hydrogen and methyl and R_{25} is a member selected from the group consisting of hydrogen and hydroxy and wherein the dashed line at C-22-23 represents the optional presence of a double bond, which comprises: p1 a. treating R_{24}, R_{25}-Δ^4-cholestene-3-one of formula I with 2,3-dichloro-5,6-dicyano-1,4-benzoquinone in the presence of a hydrocarbon solvent having a boiling point of about 70° to about 120° C. to produce R_{24}, R_{25}-$\Delta^{1,4}$-cholestediene-3-one of formula II;

b. rearranging the product of Step (a) with a proton abstracting base to produce R_{24}, R_{25}-$\Delta^{1,5}$-cholestediene-3-one of formula III;

c. treating the product of Step (b) with a reducing agent capable of reducing a keto group to a hydroxy group to produce R_{24}, R_{25}-$\Delta^{1,5}$-cholestediene-3β-ol of formula IV;

d. treating the product of Step (c) with an oxidizing agent capable of epoxidizing the 3-hydroxy-Δ'-system to produce R_{24},R_{25},1α, 2α-epoxy-Δ^5-cholestene-3β-ol of formula V; and

e. treating the product of Step (d) with a reducing agent capable of reducing the epoxide group to a hydroxy group to produce R_{24},R_{25},1α-hydroxycholest-5-enol of formula VI.

6. The compound of claim 4 which is 1α,2α-epoxy-Δ^5-cholestene-3β-acetate.

4,046,761

PROCESS FOR PREPARING CEPHALOSPORIN DERIVATIVES

Jan Verweij, Leiden, and Hong Sheng Tan, Bleiswijk, both of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

Division of Ser. No. 547,948, Feb. 7, 1975, Pat. No. 4,007,202.
This application Mar. 4, 1976, Ser. No. 664,056
Claims priority, application United Kingdom, Feb. 8, 1974, 05811/74
Int. Cl.² C07D 501/02; A61K 31/545
U.S. Cl. 544—17 3 Claims

1. The process of claim 3 wherein acetic acid is added to the reaction mixture.

4,046,762

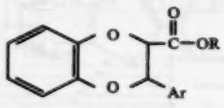
ESTERS AND AMIDES OF 3-ARYL-1,4 BENZODIOXAN-2-CARBOXYLIC ACIDS

Elso Manghisi, Monza, and Aldo Salimbeni, Milan, both of Italy, assignors to Instituto Luso Farmaco D'Italia S.r.l., Milan, Italy

Filed Oct. 17, 1973, Ser. No. 407,109
Claims priority, application Italy, Oct. 20, 1972, 30778/72
Int. Cl.² C07D 295/00
U.S. Cl. 544—148 5 Claims

1. A compound of the formula

(I)



or a pharmaceutically acceptable salt thereof, in which Ar represents a monocarbocyclic substituted or unsubstituted aryl group, and R is an ω-aminoalkyl, an ω-aminoalkoxyalkyl radical or an ω-aminoalkyl wherein the amino group is

wherein R_1 and R_2 are identical or different, and are hydrogen, lower alkyl, or R_1 and R_2 are joined together to form an N,N-alkyleneimino, an N,N-oxoalkyleneimino, or an N,N-aza-alkyleneimino group in which the alkylene has three to eight carbon atoms.

4,046,763

2,3-DIPHENYL-5-ETHYLPYRAZINE

Norman Schwartz, Philadelphia, and Richard J. Mohrbacher, Fort Washington, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Division of Ser. No. 774,486, Nov. 8, 1968, Pat. No. 3,761,477.
This application Nov. 17, 1972, Ser. No. 307,684
Int. Cl.² C07D 241/12
U.S. Cl. 260—250 B 1 Claim

1. 2,3-diphenyl-5-ethylpyrazine.

4,046,764

METHOD AND APPARATUS FOR MEASURING THE THERMAL NEUTRON ABSORPTION RATE IN EARTH FORMATIONS

Gerald L. Marquis, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 2, 1975, Ser. No. 564,233
Int. Cl.² G01V 5/00
U.S. Cl. 250—262 5 Claims

1. Apparatus for investigating the character of earth substances and the like, comprising:

means for irradiating said substances with a burst of neutrons;

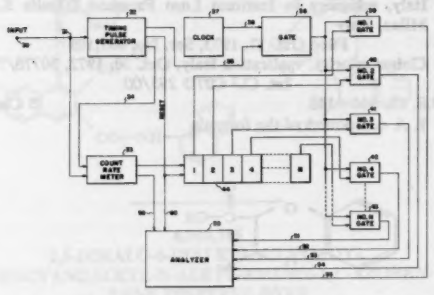
means for detecting radiation occasioned in said irradiated substances by said burst of neutrons during a preselected time interval following said burst of neutrons and for generating electrical pulses indicative of said detected radiation;

circuit means for determining the time relationship of each of said electrical pulses with respect to said time interval;

circuit means for determining the arithmetic mean of said electrical pulses as determined with respect to said time interval; and

circuit means for computing the macroscopic thermal neu-

tron capture cross section from the said arithmetic mean based upon the following relationship:



$$\Sigma \simeq \frac{K_0}{Vt} - K_1 t$$

where

Σ = macroscopic thermal neutron capture cross section

K_0 = a first constant

K_1 = a second constant

V = speed of thermal neutrons

t = arithmetic mean of said electrical pulses.

4,046,765

DIHYDROQUINOLINE DERIVATIVES OF ANTIOXIDANT ACTIVITY AND A PROCESS FOR THE PREPARATION THEREOF

Vilmos Bar; Jeno Mercz; Janos Szvoboda; Zsuszanna B. Pollak, and Jakab Matyas, all of Budapest, Hungary, assignors to Material Ksz., Budapest, Hungary

Division of Ser. No. 285,168, Aug. 31, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,293

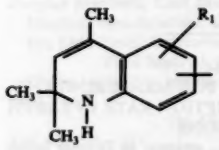
Claims priority, application Hungary, Sept. 7, 1971, BA 2642

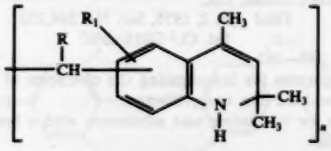
Int. Cl.² C07D *401/06, 401/14*

U.S. Cl. 260—288 CE **11 Claims**

1. A process for the preparation of a nontoxic dihydroquinoline-aldehyde condensation product, having the formula /I/

/I/





wherein

R represents hydrogen or a lower alkyl group of 1 to 4 carbon atoms,

R_1 represents hydrogen or a methyl group which may be attached in any of the free positions to the ring system, with the exception of position 6,

n is 1, 2 or 3,

or the addition salts of these compounds with nontoxic acids, comprising the steps of reacting the heterocycle 2,2,4-trimethyl-1,2-dihydroquinoline or a derivative thereof having a further methyl group but being unsubstituted in the 6-position, or an acid addition salt of these compounds with 0.5 to 1.0 molar equivalents of an aldehyde of the formula

R — CHO

wherein R has the same meaning as defined above in the presence of a solvent and of a catalyst, said catalyst being an acid or a metal halide of acidic character, at temperatures between room temperature and the boiling point of the reaction mixture, and removing any unreacted starting compound and catalyst where toxic from the reaction mixture, at least one pair of adjacent heterocycles being joined through said aldehyde at 6, 6 positions of same.

4,046,766

QUINOLIZINIUM RESINS AND MONOMERS AND METHODS FOR MAKING THEM

Charles Richard Costin, Willow Grove, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Feb. 18, 1975, Ser. No. 550,493

Int. Cl.² C07D *211/00*; C08F *8/28*

U.S. Cl. 260—290 HL **3 Claims**

1. A vinyl quinolizinium monomer in which the vinyl group, $-CH=CH_2$, is bonded directly to a quinolizinium ring carbon atom.

4,046,767

PIPERIDINO COMPOUNDS

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

Division of Ser. No. 564,508, April 2, 1975, which is a continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application June 16, 1976, Ser. No. 697,081

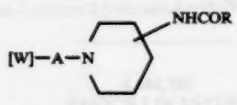
Claims priority, application United Kingdom, Sept. 3, 1970, 42090/70; July 22, 1971, 34376/71

Int. Cl.² C07D *211/36*

U.S. Cl. 260—293.77 **13 Claims**

1. A compound of formula Ia

Ia



wherein [W]represents cyclohexyl, monohalophenyl, dihalophenyl, lower alkoxyphenyl, dilower alkoxyphenyl, trilower alkoxyphenyl, di(loweralkyl)phenyl, methylenedioxyphenyl, lower alkanoylaminophenyl, nitrophenyl, or aminophenyl. A is lower alkylene of 1 to 6 carbon atoms, and R represents phenyl or a pharmaceutically acceptable acid addition salt thereof.

4,046,768

1-THIAZOLYL-5-PYRIDYLCARBONYLOXYIMIDAZOLIDINONES

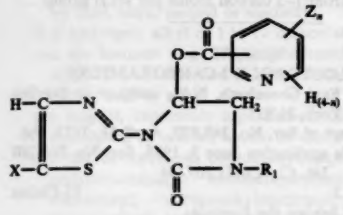
John Krenzer, Oak Park, and Chin Ching Wu, Libertyville, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Filed June 17, 1976, Ser. No. 696,957

Int. Cl.² C07D *417/14*

U.S. Cl. 260—294.8 D **8 Claims**

1. A compound of the formula



wherein X is selected from the group consisting of halogen and lower alkylsulfonyl; R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and propargyl; Z is selected from the group consisting of lower alkyl and halogen; and *n* is an integer from 0 to 2.

4,046,769

4,10-DIHYDRO-4,10-DIOXO-1H-1-BENZOPYRANO[3,2-B]PYRIDINE-2-CARBOXYLIC ACIDS AND ESTERS

David T. Connor, Parsippany; Patricia A. Young, Madison, and Max von Strandtmann, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

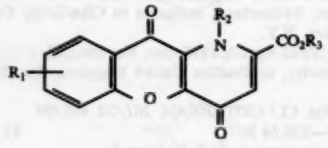
Filed Oct. 29, 1976, Ser. No. 736,788

Int. Cl.² C07D *491/04*

U.S. Cl. 260—295 T **14 Claims**

1. A compound of the formula:

I.



wherein R_1 is hydrogen, lower alkyl, halogen, hydroxy or lower alkoxy; R_2 is hydrogen, aralkyl or lower alkyl; R_3 is hydrogen or lower alkyl.

4,046,770

N-(6-ACYLOXYBENZOTHIAZOL-2-YL)-N'-PHENYL (OR SUBSTITUTED PHENYL)UREAS

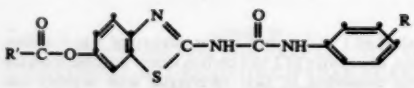
Charles J. Paget, Indianapolis, and James H. Wikel, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 502,129, Aug. 30, 1974, Pat. No. 3,932,434. This application Nov. 28, 1975, Ser. No. 635,832

Int. Cl.² C07D *277/82*

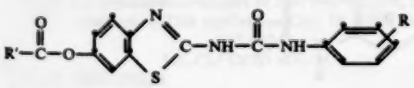
U.S. Cl. 260—305 **9 Claims**

1. A compound of the formula



wherein R is hydrogen, halo, (C_1–C_3) alkyl or ($C_1$14 C_3) alkoxy and R' is ($C_1$14 C_3) alkyl.

6. A compound of the formula



wherein R is hydrogen, halo, (C_1–C_3) alkyl or (C_1–C_3) alkoxy and R' is phenyl.

4,046,771

STYRYL DYESTUFFS

Hermann Beecken, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

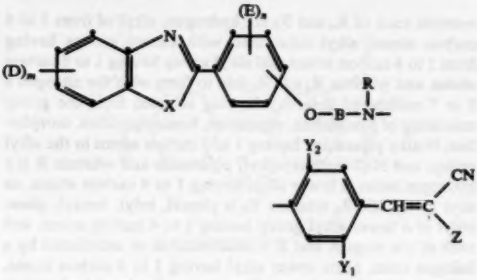
Filed Sept. 26, 1975, Ser. No. 617,142

Claims priority, application Germany, Oct. 3, 1974, 2447229

Int. Cl.² C07D *263/56*

U.S. Cl. 260—307 D **4 Claims**

1. Water-insoluble styryl dyestuffs of the formula



wherein

D and E, independently of one another, are C_1-C_4-alkyl, C_1-C_4-alkoxy, trifluoromethyl, chlorine or bromine, and D additionally is phenyl, benzyl, cyclopentyl or cyclohexyl; provided that when more than one substituent on the same nucleus is tetra-butyl or trifluoromethyl they are on nonadjacent carbon atoms;

m and *n*, independently of one another, are numbers 0 to 4;

B is C_2H_4, —$CH(CH_3)CH_2$—, —$CH(CH_2OCH_3)CH_2$—, or —$CH(C_6H_5)CH_2$—;

R is hydrogen, C_1-C_4-alkyl, or C_1-C_4-alkyl substituted by ethoxy, methoxy, cyano, or phenyl;

Y_1 is hydrogen, C_1-C_4-alkyl, trifluoromethyl, C_1-C_4-alkoxy, or chlorine;

Y_2 is hydrogen, C_1-C_4-alkyl, C_1-C_4-alkoxy, or chlorine;

x is —O—; and

Z is cyano or COOR, where R_1 is C_1-C_4-alkyl or C_1-C_4-alkyl substituted by methoxy, ethoxy, chlorine, cyano, or phenyl.

4,046,772

BENZODIAZEPINE DERIVATIVE AND PROCESS FOR PRODUCING THE SAME

Yutaka Kuwada, Ashiya; Hiroyuki Tawada, Takatsuki, and Kanji Meguro, Takarazuka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

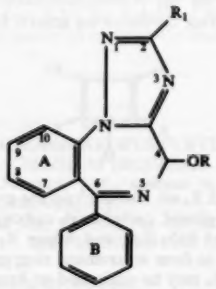
Filed Apr. 9, 1975, Ser. No. 566,434

Claims priority, application Japan, Apr. 12, 1974, 49-41229

Int. Cl.² C07D *487/14*

U.S. Cl. 260—308 R **17 Claims**

1. A compound of the general formula (I):



wherein R_1 represents a hydrogen atom, cyclopropylmethyl, cyclopentyl, cyclohexyl, an alkyl group of from 1 to 6 carbon atoms, carboxyl, $-COOR_3$ wherein R_3 is alky of from 1 to 4 carbon atoms, or

wherein each of R_4 and R_5 are hydrogen, alkyl of from 1 to 6 carbon atoms, alkyl substituted with alkoxy groups having from 1 to 4 carbon atoms said alkyl group having 1 to 6 carbon atoms, and wherein R_4 and R_5 join to form with the nitrogen a 5 to 7 membered heteroxyclic ring selected from the group consisting of pyrrolidine, piperidine, homopiperidine, morpholine, N-alkylpiperazine having 1 to 3 carbon atoms in the alkyl group, and N-(2-methoxyethyl) piperazine and wherein R is a hydrogen atom, a lower alkyl having 1 to 4 carbon atoms, an acyl group $-COR_6$ wherein R_6 is phenyl, tolyl, benzyl, phenethyl or a lower alkyl group having 1 to 4 carbon atoms, and each of the rings A and B is unsubstituted or substituted by a halogen atom, nitro, lower alkyl having 1 to 4 carbon atoms, trifluoromethyl or a lower alkoxy group having 1 to 4 carbon atoms, and the pharmaceutically acceptable acid addition salts thereof.

4,046,773

CARBAMOYL-IMIDAZOLE DERIVATIVE HAVING PESTICIDAL ACTIVITY

Viktor Andriska; Katalin Gorog nee Privitzer; Gyorgyi Bruckner; Zsuzsanna Nemessanyi nee Szekely; Miklos Havasi, all of Budapest; Bela Raskay, Veszprem; Erzsebet Grega nee Toth, Miskolc; Terez Szigeti nee Haranghy, Miskolc; Jozsef Dudas, Miskolc; Gyula Szilagyi, Miskolc; Sandor Marosvolgyi, Miskolc; Pal Gribovszky, Miskolc; Zoltan Pinter, Miskolc, and Gyozo Bors, Miskolc, all of Hungary, assignors to Nehezvegyipari Kutato Intezet, Veszprem and Eszakmagyarorszagi Vegyimuvek, Sjobabony, both of, Hungary

Filed June 18, 1973, Ser. No. 370,620

Int. Cl.[2] C07D *233/66*

U.S. Cl. 548—339 **3 Claims**

1. 1-Phenylcarbamoyl-2-methyl-5-nitroimidazole.
2. 1-(4-chlorophenyl)-carbamoyl-2-methyl-5-nitroimidazole.
3. 1-(3,4-dichlorophenyl)-carbamoyl-2-methyl-5-nitroimidazole.

4,046,774

PROCESS FOR N-PHOSPHORYLATION OF HETEROCYCLIC AMINES

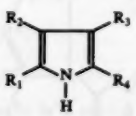
Roger P. Napier, Califon, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,393

Int. Cl.[2] C07D *209/86*

U.S. Cl. 260—315 **5 Claims**

1. A process for the N-phosphorylation of heterocyclic acidic amines having the following general formula:



where R_1 through R_4 are selected from the group consisting of H, C_1–C_{25} alkyl, phenyl, carbalkoxyl, carboxy, nitro, alkythio, alkoxy, halo, and haloalkyl; and where R_1 and R_2 may be connected so as to form an aromatic ring; and where R_1 and R_2 and R_3 and R_4 may be connected to form respective aromatic rings comprising treating said amine with a complex formed by a mixture of bromotrichloromethane and a trialkyl phosphite having from 1–3 carbon atoms per alkyl group.

4,046,775

4,5-DIHALOPYRROLE-2-CARBOXAMIDES

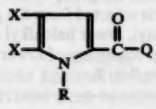
Denis M. Bailey, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 349,973, April 11, 1973, Pat. No. 3,963,480. This application June 3, 1975, Ser. No. 583,280

Int. Cl.[2] C07D *207/44*

U.S. Cl. 260—326.2 **22 Claims**

1. A compound having the formula:



wherein X is chlorine, bromine or iodine, both values of X being identical; R is hydrogen or lower-alkyl; and Q is a member of the group consisting of benzylamino, hydrazino, phenylamino or phenylamino substituted in the phenyl ring by from one to two lower-alkoxy, halogen, lower-alkyl, trifluoromethyl, nitro or sulfamoyl groups.

4,046,776

HETEROCYCLIC SUBSTITUTED LACTONE COMPOUNDS

Robert Garner, Bury, England, and Jean-Claude Petitpierre, Kaiseraugst, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

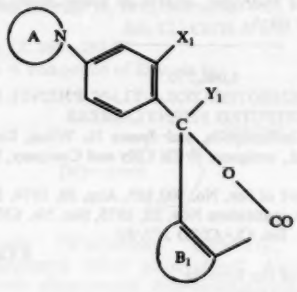
Filed Apr. 2, 1975, Ser. No. 564,383

Claims priority, application United Kingdom, Apr. 9, 1974, 15645/74

Int. Cl.[2] C07D *209/04, 261/20, 405/04*

U.S. Cl. 260—326.14 R **11 Claims**

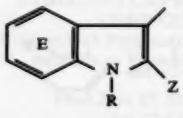
1. A lactone compound of the formula



wherein

X_1 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 8 carbon atoms, or acyloxy of 2 to 8 carbon atoms selected from the group consisting of akyl carboxylic acid acyloxy and benzoyloxy;

Y_1 represents



wheren

R is hydrogen, alkyl of 1 to 12 carbon atoms, alkenyl of up

to 12 carbon atoms, alkanoyl of 2 to 4 carbon atoms, phenyl, benzyl or phenyl or benzyl which are substituted by halo, nitro, methyl or methoxy;

Z is hydrogen, alkyl of 1 to 12 carbon atoms or phenyl;

and the benzene ring E is unsubstituted or substituted by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halo or nitro;

the ring B, represents naphthalene, benzene or benzene substituted by chloro, bromo or nitro; and

the ring A represents pyrrolidinyl, piperidino, pipecolino, perhydroazepinyl, hexamethyleneiminyl, heptamethylene-iminyl, octamethyleneiminyl, 1,2,3,4-tetrahydroquinolinyl indolinyl, phthalimidinyl, hexahydrocarbozolyl.

4,046,777

FLUORINE SUBSTITUTED MALEIMIDES

Albrecht Müller, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 3, 1975, Ser. No. 610,515

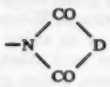
Claims priority, application Switzerland, Sept. 19, 1974, 12722/74

Int. Cl.² C07D *207/12*

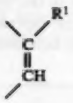
U.S. Cl. 260—326.26 **4 Claims**

1. A fluorine-containing imide of the formula

in which a denotes 1 or 2 and R denotes the radical



wherein D represents a divalent radical



R^1 is hydrogen or methyl, and in which *b* denotes a number from 3 to 5 if $a = 1$, or *b* denotes 3 or 4 if $a = 2$, and if $a = 2$ the two radicals are preferably in the p- or in the m-position to one another.

4,046,778

PROCESSES FOR THE PREPARATION OF 4-HYDROXY-2H-1-BENZOTHIOPYRAN-3-CARBOXAMIDE 1,1-DIOXIDES

Harold Zinnes, Rockaway, and Neil A. Linda, Chatham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 604,369, Aug. 13, 1975, Pat. No. 4,007,203, which is a continuation-in-part of Ser. No. 163,076, July 15, 1971, abandoned. This application Oct. 18, 1976, Ser. No. 733,487

Int. Cl.² C07D *409/04*

U.S. Cl. 260—326.34 **1 Claim**

1. 4-(1-pyrrolidinyl)-2H-1-benzothiopyran-3-carboxyl chloride 1,1-dioxide.

4,046,779

DIBENZOFURAN-2,3,6,7-TETRACARBOXYLIC ACID DIANHYDRIDE

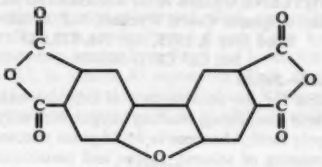
Imre Puskas, Glen Ellyn, and Ellis K. Fields, River Forest, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 30, 1975, Ser. No. 582,357

Int. Cl.² C07D *493/14*

U.S. Cl. 260—346.22 **1 Claim**

1. The dibenzofuran-2,3,6,7,-tetracarboxylic dianhydride, structurally represented as follows:



4,046,780

PREPARATION OF PHTHALIC ANHYDRIDE

Yoshiyuki Nakanishi, Minoo; Shigeru Nakamura, Takatsuki, and Tetsuji Ono, Amagasaki, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Oct. 29, 1975, Ser. No. 626,913

Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.4 **9 Claims**

1. A method for preparing phthalic anhydride by catalytic vapor phase oxidation of ortho-xylene or naphthalene, which comprises passing a gas mixture comprising molecular oxygen, an inert gas and a member selected from the group consisting of ortho-xylene and naphthalene through a catalyst A comprising a first catalytically active substance on a first porous inert carrier, said first catalytically active substance consisting essentially of 1 to 20 parts by weight of V_2O_5, 99 to 80 parts by weight of anatase-type TiO_2, and, based on the total weight of V_2O_5 and TiO_2, 0.01 to 1.0% by weight of Nb_2O_5, 0.5 to 1.1% by weight of P_2O_5, 0 to 0.25% by weight of K_2O and 0 to 0.5% by weight of Cs_2O, the total weight of the K_2O and Cs_2O being at least 0.05% by weight, 0.05 to 0.3% by weight of Na_2O and 0 to 0.5% by weight of Rb_2O, said first porous inert carrier predominantly containing SiC, and

passing the thus treated gas mixture through a catalyst B comprising a second catalytically active substance on a second porous inert carrier, said second catalytically active substance consisting essentially of 1 to 20 parts by weight of V_2O_5, 99 to 80 parts by weight of anatase-type TiO_2, and, based on the total weight of the V_2O_5 and TiO_2, 0.01 to 1.0% by weight of Nb_2O_5, 1.2 to 2.5% by weight of P_2O_5, 0 to 0.25% by weight of K_2O and 0 to 0.5% by weight of Cs_2O, the total weight of the K_2O and Cs_2O being at least 0.05% by weight, 0.05 to 0.3% by weight of Na_2O and 0 to 0.5% by weight of Rb_2O, said second porous inert carrier predominantly containing SiC.

4,046,781

BIS-[5-(4-CHLOROPHENYL)FURFURYL]DIALKYLAMMONIUM BROMIDES

Chia-Nien Yu, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 17, 1976, Ser. No. 687,404

Int. Cl.² C07D *307/52*

U.S. Cl. 260—347.7 **4 Claims**

1. A compound of the formula:

wherein R and R_1 are methyl or n-butyl.

4,046,782

PROCESS FOR THE INDUSTRIAL PRODUCTION OF ETHYLENE OXIDE AND AROMATIC ACID

John Kollar, 6 Spencer Court, Wyckoff, N.J. 07481

Filed May 8, 1975, Ser. No. 575,643
Int. Cl.² C07D *301/06*
U.S. Cl. 260—348.32 30 Claims

1. Process for the manufacture of ethylene oxide and an aromatic acid comprising, reacting oxygen with ethylene and a mono or poly methyl benzene in liquid phase selected from the group consisting of toluene, xylene and pseudocumene, at a temperature within the range from 150° C to 300° C and a pressure within the range from 100 p.s.i.a. to 4000 p.s.i.a. and with the ethylene in the reaction mixture within the range from 0.1 wt. % to 9 wt. %, to form an oxidate comprising the alcohol and the aldehyde of said methyl benzene and to form ethylene oxide, removing the said ethylene oxide, removing the unreacted mono or polymethyl benzene, and further oxidizing the said oxidate to the corresponding aromatic acid.

4,046,783

METHOD OF OLEFIN EPOXIDATION

Stanley B. Cavitt, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 382,919, July 26, 1973, abandoned, which is a division of Ser. No. 102,227, Dec. 28, 1970, Pat. No. 3,956,180. This application July 23, 1975, Ser. No. 598,498
Int. Cl.² C07D *301/06*
U.S. Cl. 260—348.33 5 Claims

1. A method for epoxidizing olefins to the corresponding oxirane in liquid phase, which comprises the step of:

intimately contacting an olefinically unsaturated compound with an epoxidizing amount of a molecular oxygen epoxidizing agent in the presence of a solubilizing amount of a suitable nonpolar solvent and a catalytically effective amount of an oxidized alkyl molybdate complex at epoxidizing temperatures of from about 210° C to about 270° C and at pressures sufficient to maintain the reaction mixture consisting essentially of the olefin, solvents, products and by-products substantially in liquid phase, wherein said oxidized alkyl molybdate complex is prepared by

initially forming a lower oligomeric alkyl molybdate,, by heating a compound selected from a group consisting of ammonium molybdate, ammonium paramolybdate, 85% molybdic acid and mixtures thereof with an excess of a primary or secondary aliphatic monohydric alcohol having from about 6 to about 30 carbon atoms to a temperature sufficient to substantially dissolve said molybdate; and

oxidizing said lower oligomeric alkyl molybdate with an oxidizing amount of molecular oxygen.

4,046,784

BORIDE CATALYST FOR EPOXIDIZING OLEFINIC COMPOUNDS

Robert Malone Gipson, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 565,004, April 4, 1975. This application June 25, 1976, Ser. No. 699,838
Int. Cl.² C07D *301/20*
U.S. Cl. 260—348.29 2 Claims

1. A method for the liquid phase epoxidation of olefin having from about 2 to about 60 carbon atoms with an organic hydroperoxide comprising the step of:

intimately contacting said olefin with said organic hydroperoxide at lower temperatures of about 25° C to about 200° C and pressures sufficient to maintain the product and reactants substantially in liquid phase in the presence of a catalytically effective amount of a binary boride compound consisting of boron and lanthanum.

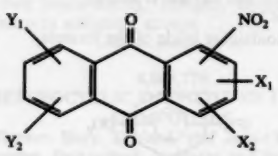
4,046,785

PROCESS FOR PREPARING AMINOANTHRAQUINONES

Yutaka Hirai; Katsuharu Miyata; Tagui Osawa; Muneyasu Samecima; Ken Mukai; Koichi Yoshiura, and Hidetoshi Mori, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Dec. 18, 1975, Ser. No. 641,832
Claims priority, application Japan, Dec. 20, 1974, 49-145615
Int. Cl.² C09B *1/16, 1/36, 1/50*
U.S. Cl. 260—380 9 Claims

1. A process for preparing aminoanthraquinones, which comprises catalytically hydrogenating a nitroanthraquinone of the general formula



(I)

wherein X_1 represents a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group, a carboxyl group or a phenoxy group whose benzene nucleus optionally contains a substituent, X_2 represents a hydrogen atom, a hydroxyl group or an amino group, and Y_1 and Y_2, independently from each other, represent a hydrogen atom, a halogen atom, a nitro group, an amino group, a hydroxyl group, a lower alkyl group, a lower alkoxy group or a phenoxy group whose benzene nucleus optionally contains a substituent, with the proviso that when the nitro group is bonded to the 1-position, X_1, X_2, Y_1 and Y_2 do not at the same time represent a hydrogen atom,

in the suspended state in an aqueous medium in the presence of a hydrogenating catalyst.

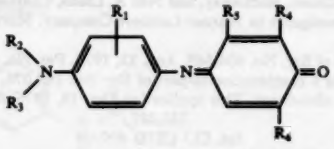
4,046,786

INDOANILINES

Gregoire Kalopissis, Paris; Andrée Bugaut, Boulogne-sur-Seine, and Françoise Estradier, Paris, all of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 482,523, June 24, 1974, Pat. No. 3,929,404. This application Oct. 3, 1975, Ser. No. 619,477
Claims priority, application Luxembourg, June 22, 1973, 67860
Int. Cl.² C07C *119/12, 127/17, 143/75*
U.S. Cl. 260—396 N 9 Claims

1. An indoaniline having the formula



wherein:

R_1 represents hydrogen, halogen, alkyl or alkoxy;

R_2 represents alkyl and hydroxyalkyl;

R_3 represents hydroxyalkyl, carbamylalkyl, sulfoalkyl, dialkylaminoalkyl, acetylaminoalkyl and mesylaminoalkyl;

R_4, R_5 and R_6 each independently represent hydrogen, halogen, alkyl, alkoxy, acetylamino, ureido or carbalkoxyamino,

with the proviso that at least one of R_4, R_5 and R_6 is other than hydrogen or halogen and that at least two of said R_4, R_5 and R_6 are other than hydrogen when R_4 or R_6 is methyl and R_5 can further represent amino, alkylamino, hydroxyalkylamino and carbamylalkylamino,

wherein the alkyl and alkoxy groups contain from 1 to 6 carbon atoms.

4,046,787

NOVEL 15-SUBSTITUTED PROSTANOIC ACIDS AND ESTERS

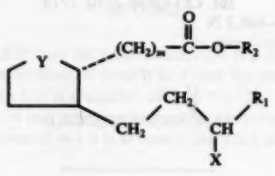
Robert Eugene Schaub, Upper Saddle River, and Martin Joseph Weiss, Oradell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 468,795, May 9, 1974, Pat. No. 3,932,472, which is a division of Ser. No. 274,558, July 24, 1972, Pat. No. 3,835,179. This application Oct. 24, 1975, Ser. No. 625,406

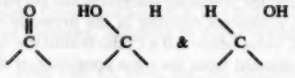
Int. Cl.² C07C *177/00*

U.S. Cl. 260—399 **16 Claims**

1. A compound of the formula:



wherein m is an integer from 5 to 8, inclusive; R_1 is an alkyl group having from 3 to 6 carbon atoms, inclusive; R_2 is selected from the group consisting of hydrogen and an alkyl group having up to 4 carbon atoms; X is selected from the group consisting of mercapto and lower alkanoylthio; and Y is a divalent radical selected from the group consisting of those of the formulae:



and the pharmaceutically acceptable cationic salts thereof when R_2 is hydrogen.

4,046,788

NICKEL STABILIZERS FOR SYNTHETIC POLYMERS

Michael Rasberger, Allschwil; Jean Rody, Basel; Paul Moser, Riehen, and Helmut Müller, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 491,978, July 26, 1974, Pat. No. 3,948,852. This application Mar. 3, 1976, Ser. No. 663,332

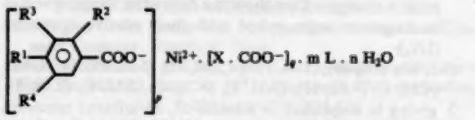
Claims priority, application Switzerland, Aug. 7, 1973, 11407/73; Jan. 28, 1974, 1103/74

Int. Cl.² C11C *1/00*

U.S. Cl. 260—404 **11 Claims**

1. Compounds of the formula I

-continued



(I)

wherein either R^1 is hydroxyl and R^2 is hydrogen or R^1 is hydrogen and R^2 is hydroxyl, R^3 and R^4 are hydrogen or alkyl with 1–5 C atoms, either p is 1 and q is 1 or p is 2 and q is zero, X is optionally hydroxyl-substituted alkyl, cycloalkyl, aryl, alkaryl or aralkyl, m is a value from 1–2 and, if $q = 1$, can also be zero, n represents a value from 0 to 2 and L denotes a ligand $R^5—N(R^6)—R^7$, in which R^5 represents alkyl, alkoxyalkyl, alkylthioalkyl, aryl, aralkyl or cycloalkyl and R^6 represents H, alkyl, aralkyl or cycloalkyl and R^7 is H, alkyl or aralkyl.

4,046,789

PROCESS FOR THE SEPARATION OF WASTE PRODUCTS OF THE FOOD INDUSTRY

Hans Muller, Erlenbach, and Louis Grob, Zurich, both of Switzerland, assignors to Chemap AG, Mannedorf, Switzerland

Filed Dec. 2, 1975, Ser. No. 636,946

Claims priority, application Switzerland, Dec. 3, 1974, 16286/74; Jan. 31, 1975, 1286/75; Aug. 22, 1975, 11011/75

Int. Cl.² C11B *13/00*; A23J *1/18*; C13D *1/14*

U.S. Cl. 260—412.8 **6 Claims**

1. A process for separately recovering or converting for reuse the fats, sugar, protein and starch from wastes occurring in the making of bakery products and containing these components,

the said process comprising

1. subjecting the comminuted waste product to a first extraction filtration with a liquid fat solvent, removing the filtered-out fat solution, recovering the fat and recycling the solvent;
2. then subjecting the degreased product to a second extraction-filtration step in the same extraction-filtration zone with an aqueous or alcoholic sugar solvent, followed by removing the filtered-out sugar solution from said suspension and recovering the sugar therefrom; and
3. thereafter withdrawing the filter residue from said extraction-filtration zone and subjecting it to an acidic or enzymatic hydrolysis and aerobic fermentation with a yeast, subjecting the product to purification and concentration and then drying the concentrate so as to recover a solids product in the form of crude protein and yeast for reuse in food products.

4,046,790

CATALYTICALLY ACTIVE COMPLEX OF TITANIUM, CYCLOPENTADIENYL LIGANDS, AND AMMONIA

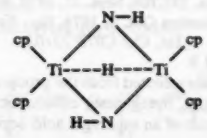
John N. Armor, Morris Plains, and Guido P. Pez, Boonton, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Aug. 5, 1976, Ser. No. 712,107

Int. Cl.² C07F *7/28*

U.S. Cl. 260—429.5 **4 Claims**

1. Composition having the structural formula, when in crystalline form,



where cp indicates a cyclopentadienyl ligand; said compound, being characterized by,

1. giving a powder x-ray diffraction pattern in which the twelve strongest lines show the following Bragg spacings in Angstrom units, paired with their relative intensities (I/I_1):
(9.5, 45); (7.0, 89); (5.74, 100); (5.50, 72); (5.20, 28); (4.79, 42); (4.27, 8); (4.02, 15); (3.91, 4); (3.71, 6); (3.38, 4); (2.69, 8).
2. giving in suspension in mineral oil, an infrared spectrum showing bands characteristic of compounds containing the $(cp)_2Ti$ moiety and unique characteristic bands at wave numbers of 1585, 1230, 910 and 430 cm^{-1}; and
3. giving a solid state reflectance spectrum in the visible-near infrared region showing a broad band centered at wavelength of 495 ± 10 nm and additional bands at 1300, 1540, 1650 and 1860nm; and in benzene solution giving a visible-near infrared absorption spectrum showing a band at 495 nm and no intense bands between 800nm and 2,000nm.

4,046,791

METHOD FOR PRODUCING MONOALKYL-TIN-TRIHALIDES

Sumio Matsuda, Ibaraki, and Hajime Kudara, Shiga, both of Japan, assignors to Chugoku Marine Paints, Ltd., Hiroshima, Japan

Filed Sept. 15, 1975, Ser. No. 613,155
Claims priority, application Japan, Mar. 20, 1975, 50-33706; Apr. 9, 1975, 50-43533
Int. Cl.² C07F 7/22
U.S. Cl. 260—429.7 **8 Claims**

1. A method for producing monoalkyl-tin-trihalides comprising reacting a stannous halide of the formula SnX_2 wherein X is selected from the group consisting of chlorine and bromine, with an alkyl halide of the formula RX wherein R is an alkyl group having 1 to 8 carbon atoms and X is selected from the group consisting of chlorine and bromine, in an organic solvent consisting of a mixture of tetrahydrofuran and an aromatic hydrocarbon having 6 to 9 carbon atoms, in the presence of a catalyst consisting of iodine and magnesium, and isolating said resulting monoalkyl-tin-trihalide from the reaction mixture.

4,046,792

PROCESS FOR PREPARING METHYLTIN CHLORIDES

Wolfgang Deinhammer; Manfred Wick, and Antonio Macri, all of Munich, Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

Filed Mar. 1, 1976, Ser. No. 662,482
Claims priority, application Germany, Mar. 4, 1975, 2514459
Int. Cl.² C07F 7/22
U.S. Cl. 260—429.7 **5 Claims**

1. A process for the preparation of methyltin chlorides, which comprises reacting tetramethylsilane with tin tetrachloride at a temperature of from about 20° to 250° C.

4,046,793

CHELATES FOR THE REGULATION OF METAL-DEFICIENCY PHENOMENA IN PLANTS

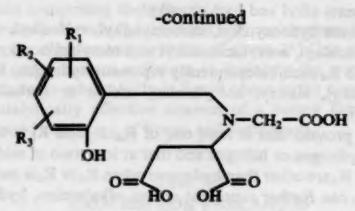
Peter Baccini, Kriens, and Werner Fory, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 292,708, Sept. 27, 1972, Pat. No. 3,855,286. This application Oct. 3, 1974, Ser. No. 511,971
Int. Cl.² C07F 15/02
U.S. Cl. 260—439 R **6 Claims**

1. A metal chelate selected from the group consisting of iron, magnesium, calcium, manganese, cobalt, nickel, copper, zinc and cadmium metals of an asparagic acid derivative of formula I

(I)

-continued



wherein
R_1 represents hydrogen, hydroxy, halogen, sulpho, carboxyl C_1–C_6 alkyl, C_1–C_6 alkoxy, C_1–C_6 halogenoalkyl, di-(C_1–C_6 alkyl) amino, C_2–C_4 alkanoyl or phenyl,
R_2 represents hydrogen, hydroxy, halogen, C_1–C_6 alkyl or C_1–C_6 alkoxy, and
R_3 represents hydrogen or C_1–C_6 alkyl.

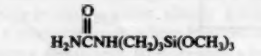
4,046,794

UREA SILICON PRODUCT AND USES THEREOF

Enrico J. Pepe, and James G. Marsden, both of Amawalk, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 244,280, April 14, 1972, Pat. No. 3,754,971, which is a division of Ser. No. 759,524, Sept. 12, 1968, Pat. No. 3,671,562, which is a continuation-in-part of Ser. No. 729,895, May 17, 1968, abandoned. This application June 18, 1973, Ser. No. 370,849
Int. Cl.² C07F 7/10, 7/18
U.S. Cl. 260—448.2 N **3 Claims**

1. The hydrolyzate of:



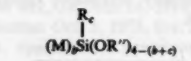
4,046,795

PROCESS FOR PREPARING THIOFUNCTIONAL POLYSILOXANE POLYMERS

Eugene Ray Martin, Onsted, Mich., assignor to SWS Silicones Corporation, Adrian, Mich.

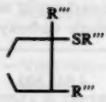
Filed Nov. 10, 1975, Ser. No. 630,475
Int. Cl.² C07F 7/08, 7/18
U.S. Cl. 260—448.2 E **22 Claims**

1. A method for preparing thiofunctional polysiloxane polymers which comprises reacting in the presence of a catalyst having a pK value below 1.0 a cyclic trisiloxane with a silicon compound selected from the class consisting of silanes of the formula

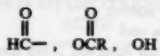


and siloxanes of the formula

in which the cyclic trisiloxane or silicon compound contains at least one thiol group, R is selected from the group consisting of a monovalent hydrocarbon radical and a halogenated monovalent hydrocarbon radical, each having from 1 to 18 carbon atoms, M is selected from the class consisting of R'(SR'')$_y$ and



R′ is selected from the group consisting of substituted and unsubstituted divalent, trivalent and tetravalent hydrocarbon radicals free of aliphatic unsaturation having from 1 to 18 carbon atoms, hydrocarbon ether, hydrocarbon thioether, hydrocarbon ester and hydrocarbon thioester radicals in which R′ is attached to a silicon atom via a silicon-carbon bond, R″ is selected from the group consisting of hydrogen and a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, R‴ is selected from the group consisting of R″ and a radical represented by the formula R⁗X, wherein X is a radical selected from the group consisting of



and a cyanoalkyl radical, in which R⁗ is a divalent hydrocarbon radical free of a aliphatic unsaturation having from 1 to 18 carbon atoms, Y is a radical selected from the class consisting of $R_3SiO_{1/2}$, RC═O and

where R and R″ are the same as above, *b* is a number of from 0 to 3, *c* is a number of from 0 to 3 and the sum of b+c is a number up to 3, *d* is a number of from 0 to 2, *e* is a number of from 1 to 3, *m* and *n* are each equal to a number of from 0 to 999 and the sum of *m*+*n* is at least 1 and *y* is a number of from 1 to 3.

4,046,796

PROCESS FOR THE PRODUCTION OF POLYFUNCTIONAL CYANIC ACID ESTERS

Gunther Rottloff, Cologne; Rudolf Sundermann, Leverkusen; Ernst Grigat, Odenthal-Gloebusch, and Rolf Putter, Duesseldorf, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 17, 1976, Ser. No. 658,815

Claims priority, application Germany, Feb. 22, 1975, 2507705; July 2, 1975, 2529487

Int. Cl.² C07C *122/00*

U.S. Cl. 260—453 P **2 Claims**

1. A process for producing a polyfunctional aromatic cyanic acid ester which compirses reacting at least one aromatic hydroxy salt selected from the group consisting of alkaline earth and alkali metal salts of aromatic polyhydroxy compounds in the presence of aqueous isopropanol as solvent and from 0.001 to 10% by weight, based on the weight of said aromatic hydroxy salt, of a catalytic tertiary amine with excess cyanogen halide, said aromatic hydroxy salt having been produced by reacting a polyhydroxy compound with an excess of up to 0.1 mol of aromatic hydroxy groups of at least one metal compound of the group consisting of alkaline earth and alkali metal compounds and said cyanogen halide excess comprised up to 1 mol per mol of aromatic hydroxy groups plus the excess mols of said metal compound used for producing said aromatic hydroxy salt plus 1.1% by weight of cyanogen halide for each percent by weight of the catalytic tertiary amine used.

4,046,797

1-METHOXY-1-METHYL-3-{P-[(1,1-DIMETHYL-2-PROPYNYLOXY)-METHOXY]PHENYL}UREA

Barrington Cross, Rocky Hill, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 584,543, June 6, 1975, which is a division of Ser. No. 283,603, Aug. 24, 1972, abandoned. This application Apr. 7, 1976, Ser. No. 674,474

Int. Cl.² C07C *127/15, 127/19*; A01N *9/20*; C07C *83/08*

U.S. Cl. 260—453 R **1 Claim**

1. 1-Methoxy-1-methyl-3-{p-[(1,1-dimethyl-2-propynyloxy)-methoxy]phenyl} urea.

4,046,798

HERBICIDAL 4-TRIFLUOROMETHYL-4′NITRODIPHENYL ETHERS

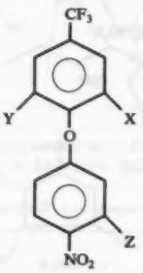
Horst O. Bayer, Levittown; Colin Swithenbank, Perkasie, and Roy Y. Yih, Doylestown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 331,719, Feb. 12, 1973, Pat. No. 3,928,416, which is a continuation-in-part of Ser. No. 234,651, March 14, 1972, Pat. No. 3,798,276. This application Sept. 29, 1975, Ser. No. 617,562

Int. Cl.² C07C *121/75*

U.S. Cl. 260—465 D **11 Claims**

1. A compound of the formula



wherein

X is a cyano group,

Y is a hydrogen atom, a halogen atom, or a trifluoromethyl group, and

Z is a hydroxy group, an alkoxy group having up to 6 carbon atoms, an alkyl group having up to 4 carbon atoms, a halogen atom, an amino group, an alkylthio group having up to 4 carbon atoms, a cyano group, a carboxyalkyl group having up to 4 carbon atoms, a carbalkoxyalkyl group having up to 6 carbon atoms, an alkanoyloxy group having up to 4 carbon atoms, or a carbamoyloxy group having up to 6 carbon atoms.

4,046,799

α-CYANO BENZYL-2-NAPHTHALENEACETATES

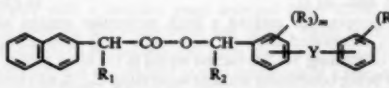
Venkataraman Kameswaran, Pennbrook, Pa., and Roger William Addor, Pennington, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 2, 1976, Ser. No. 673,244

Int. Cl.² A01N *9/20*; C07C *121/66*

U.S. Cl. 260—465 D **6 Claims**

1. A compound having the structure:



wherein R_1 represents alkyl C_1–C_4; R_2 is CN; R_3 and R_4 each

represent halogen or methyl; *m* and *n* each represent an integer 0, 1 or 2; and Y represents O, S or CH_2.

4,046,800

CIS-β-[TRIMETHYLAMMONIUM]-ACRYLONITRILE TOSYLATE

Edward J. Hessler, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 546,074, Jan. 31, 1975, Pat. No. 3,978,042. This application June 4, 1976, Ser. No. 692,947

Int. Cl.² C07C *121/78*

U.S. Cl. 260—465 E **1 Claim**

1. Cis-β-[trimethylammonium]-acrylonitrile tosylate.

4,046,801

13-CIS PROSTAGLANDIN DERIVATIVES

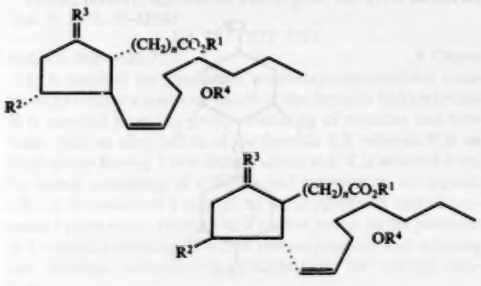
Arthur F. Kluge, Palo Alto; Karl G. Untch, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 272,880, July 18, 1972, Pat. No. 3,867,377. This application Dec. 9, 1974, Ser. No. 530,778

Int. Cl.² C07C *177/00*

U.S. Cl. 560—121 **7 Claims**

1. A 13-cis prostaglandin compound selected from the group of isomers having the formulas:



wherein *n* is a whole integer of from two through eight; R^1 is hydrogen, alkyl having from one through ten carbon atoms, chloroethyl, dichloroethyl, or trichloroethyl; R^2 is hydrogen; R^3 is oxo; and $\sim OR^4$ is hydroxy or acid labile ether having from three through ten carbon atoms wherein the wavy bond line indicates either the α or β configuration or isomer mixtures of the α and β configurations;
and mixtures of such isomers and pharmaceutically acceptable salts of such isomers and isomer mixtures wherein R^1 is hydrogen.

4,046,802

PROCESS FOR MAKING A HIGH MOLECULAR WEIGHT ALKYLPHENOXY SUBSTITUTED ALIPHATIC CARBOXYLIC ESTER

John Scotchford Elliott, Beaconsfield; Bryan Terence Davis, and Richard Martin Howlett, both of Wokingham, all of England, assignors to Edwin Cooper and Company Limited, Bracknell, England

Continuation-in-part of Ser. No. 446,461, Feb. 27, 1974, abandoned. This application Apr. 26, 1976, Ser. No. 680,210

Claims priority, application United Kingdom, Feb. 27, 1973, 09542/73

Int. Cl.² C09F *5/08, 7/10;* C07C *69/76*

U.S. Cl. 560—61 G **15 Claims**

1. A process for making a high molecular weight alkylphenoxy-substituted aliphatic carboxylic ester from an alkylphenol containing 50–200 carbon atoms in the alkyl group, said process being conducted without separating C_{50-200} alkylphenol from the resultant product, said process comprising reacting at least one alkyl-substituted phenol in which the alkyl substituent contains from 50 to 200 carbon atoms with at least one halogen-substituted aliphatic carboxylic ester to obtain said alkylphenoxy-substituted aliphatic carboxylic ester in high yield.

4,046,803

METHOD OF PREPARING β-AMINO DERIVATIVES OF α,β-UNSATURATED ESTERS

John S. Heckles, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Oct. 27, 1976, Ser. No. 736,107

Int. Cl.² C07C *119/12*

U.S. Cl. 560—172 **7 Claims**

1. A method for preparing β-amino derivatives of α,β-unsaturated esters of the formula $CH_3C(NH_2)=CHC(O)OR'$ wherein R' is C_1 to C_{10} linear or branched alkyl or substituted C_1 to C_{10} linear or branched alkyl, the substituents being those that would not interfere with the reaction, which comprises:

a. forming a reaction mixture of an alkyl acetoacetate ester of the formula $CH_3C(O)CH_2C(O)OR'$ wherein R' is the same as defined above,
   1. with ammonia and
   2. a salt of a metal selected from the group consisting of lithium, zinc, cadmium, cerium, lead or mixtures thereof in an organic solvent; said salt being soluble in said organic solvent in an amount sufficient to catalyze the reaction between said ester and said ammonia; and

b. recovering said β-amino derivative of α,β-unsaturated ester.

4,046,804

PROCESS FOR PREPARING A NOVEL BENZYLAMINE HYDRATE

Edward M. Cohen, Norristown, and Earl R. Oberholtzer, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 596,942, July 18, 1975. This application Oct. 1, 1976, Ser. No. 728,675

Int. Cl.² C07C *143/10*

U.S. Cl. 260—501.21 **3 Claims**

1. A process for preparing α,α-dimethyl-4-(α,α,β,β-tetrafluorophenethyl)benzylamine isethionate monohydrate which comprises

a. preparing an aqueous solution containing less than 10% by weight of α,α-dimethyl-4-(α,α,β,β-tetrafluorophenethyl)-benzylamine isethionate,
b. freezing said solution,
c. thawing said frozen solution at a temperature of about 5° C. and
d. separating therefrom α,α-dimethyl-4-(α,α,β,β-tetrafluorophenethyl)benzylamine isethionate monohydrate which precipitates.

4,046,805

SUBSTITUTED-HYDROXY-NAPHTHALENEDISULFONIC ACID COMPOUNDS

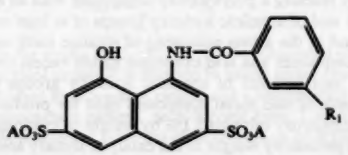
Seymour Bernstein, New City, N.Y.; Robert Herman Lenhard, Paramus, N.J., and Milton David Heller, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 10, 1976, Ser. No. 684,598

Int. Cl.² C07C *143/30;* A61K *31/185*

U.S. Cl. 260—506 **4 Claims**

1. A compound selected from those of the formula:



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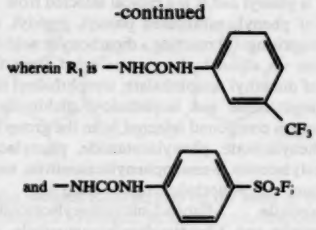


and A is hydrogen, alkali metal or alkaline earth metal, with the proviso that each A is identical in the same compound.

4,046,806

METHOD OF PREPARING A DISALT OF 3,3-SULFONYLBIS (6-HYDROXYBENZENE SULFONIC ACID)

John H. Kozlowski, Vancouver, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Sept. 12, 1975, Ser. No. 612,598
Int. Cl.² C07C *143/42*
U.S. Cl. 260—512 C **3 Claims**

1. A method of preparing an ammonium or alkali metal disalt of 3,3'-sulfonylbis (6-hydroxybenzene sulfonic acid) comprising

a. reacting 4,4'-dihydroxyldiphenyl sulfone with a sulfonating agent selected from the group consisting of chlorosulfonic acid and sulfur trioxide in the presence of sulfolane as a solvent to form 3,3'-sulfonylbis(6-hydroxybenzene sulfonic acid),

b. adding an alcohol selected from the group consisting of methanol and ethanol and a base soluble in the alcohol to the reaction mixture, the base being selected from the group consisting of hydroxides and salts of weak acids wherein the cation of the base is ammonium or an alkali metal, the base being present in an amount sufficient to form the disalt of 3,3'-sulfonylbis(6-hydroxybenzene sulfonic acid), and the alcohol being present in an amount sufficient to selectively precipitate the disalt, and

c. recovering the disalt from the reaction mixture.

4,046,807

PROCESS FOR PREPARING ACETIC ANHYDRIDE

Herbert Kuckertz, Bad Soden, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 24, 1975, Ser. No. 625,692
Claims priority, application Germany, Oct. 26, 1974, 2450965
Int. Cl.² C07C *51/10, 51/56*
U.S. Cl. 260—549 **11 Claims**

1. A process for the preparation of acetic anhydride which comprises reacting a mixture consisting essentially of acetic acid methyl ester and carbon monoxide at a pressure of 1 to 500 bar and at temperature of from 50 to 250° C and carrying out said reaction in the presence of a catalyst containing a noble metal of the 8th subgroup of the Periodic Table.

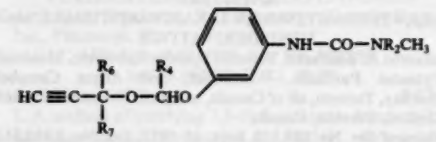
4,046,808

(ALKENYLOXY)-, (ALKYNYLOXY) AND (CYANOALKOXY) ALKOXYPHENYL UREAS AND THEIR USE AS HERBICIDES

Barrington Cross, Rocky Hill, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 283,603, Aug. 24, 1972, abandoned. This application June 6, 1975, Ser. No. 584,543
Int. Cl.² C07C *127/15, 127/19*
U.S. Cl. 260—553 A **3 Claims**

1. A compound represented by the formula:



wherein R_2, R_4, R_6 and R_7 are hydrogen or methyl.

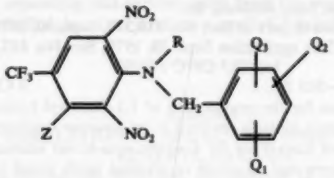
4,046,809

N-BENZYL-2,6-DINITRO-3-AMINO-4-TRIFLUOROMETHYLANILINES AS PLANT GROWTH REGULANTS

Merrill Wilcox, 2911 NW. 30th Terrace, Gainesville, Fla. 32601

Filed Dec. 16, 1974, Ser. No. 533,045
Int. Cl.² C07C *87/28*
U.S. Cl. 260—570.9 **10 Claims**

1. A compound of the formula



in which

R is lower alkyl,

Z is amino, lower alkylamino or di lower alkylamino,

each of Q_1 and Q_2 is hydrogen, halogen, lower alkyl or methoxy, and

Q_3 is hydrogen, lower alkyl or methoxy.

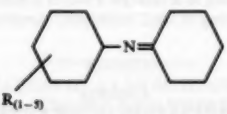
4,046,810

PROCESS FOR THE PREPARATION OF DIPHENYLAMINE AND DERIVATIVES THEREOF

Pietro Antonio Moggi, and Ugo Romano, both of Milan, Italy, assignors to SNAM Progetti S.p.A., San Donato Milanese, Italy

Continuation of Ser. No. 369,494, June 13, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,296
Claims priority, application Italy, June 24, 1972, 26169/72
Int. Cl.² C07C *87/54, 91/16, 91/18*
U.S. Cl. 260—571 **9 Claims**

1. Process for the production of a member of the group consisting of diphenylamine and the alkyl, phenyl, amino, alkoxy, hydroxy and halogen derivatives thereof consisting in reacting an imine having the formula



wherein R is a substituent selected from alkyl, H, phenyl, amine, alkoxy, hydroxy and halogen with oxygen at a temperature in the range from 300° C to 450° C by feeding to a reactor charged with a contact mass selected from silica, alumina, silica-alumina, silica-aluminate and oxides, oxide mixtures, and compounds of metals selected from the group consisting of V, Bi and Mo and maintained at said temperature a stream of said imine in the vapor phase, together with oxygen at a molar ratio in the range from 0.1:1 to 20:1 and at a rate providing a contact time in said reactor in the range from 0.1 to 20 seconds.

4,046,811

ANTIVIRAL 1,2,3,4-TETRAHYDRO-1,4-ALKANONAPHTHALENAMINE DERIVATIVES

Kekhasroo R. Bharucha, Toronto; Djordje Ajdukovic, Montreal; Vytautas Pavilanis, Westmount, and Angus Campbell Mackay, Toronto, all of Canada, assignors to Canada Packers Limited, Toronto, Canada

Division of Ser. No. 289,122, Sept. 14, 1972, Pat. No. 3,932,512. This application May 19, 1975, Ser. No. 578,871

Int. Cl.[2] C07C *87/64*

U.S. Cl. 260—578 **2 Claims**

1. A compound selected from the group consisting of 1,2,3,4-tetrahydro-1,4-methanonaphthalen-endo-2-amine and its pharmaceutically acceptable acid addition salts.

4,046,812

PROCESS FOR PREPARING 1,1-DIMETHYL HYDRAZINE

Heimo J. Langer, Columbus; Kenneth R. Robinson, and Peter E. Throckmorton, both of Worthington, all of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation-in-part of Ser. No. 510,370, Sept. 30, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,502

Int. Cl.[2] C07C *109/02*

U.S. Cl. 260—583 B **3 Claims**

1. A process for the preparation of 1,1-dimethyl hydrazine which comprises initially reacting in an aqueous medium at a temperature of from 0° to 10° C about equi-molar amounts of 1,1-dimethylurea and an alkali or alkaline earth metal hypochlorite, said hypochlorite salt associated with *x* mole of a corresponding metal hydroxide where *x* is less than one mole per mole of the hypochlorite salt but in a sufficient amount to inhibit substantially completely the decomposition thereof, and wherein the concentration of each reactant is at least about 1.0 molal, thereupon introducing an additional amount of said metal hydroxide to provide (2-*x*) moles thereof per mole of the starting 1,1-dimethylurea and reacting the basified mixture at a temperature not in excess of 30° C to effect the rearrangement thereof whereupon 1,1-dimethyl hydrazine is recovered by distillation

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4,046,813

PROCESS FOR PRODUCING KETOISOPHORONE

Wolf Brenner, Fullinsdorf, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 28, 1975, Ser. No. 563,040

Claims priority, application Switzerland, Apr. 11, 1974, 5187/74

Int. Cl.[2] C07C *45/00*

U.S. Cl. 260—586 P **8 Claims**

1. A process for oxidizing β-isophorone to ketoisophorone comprising oxidizing, in the presence of an organic aromatic nitrogen base, β-isophorone with oxygen or an oxygen containing gas utilizing as a catalyst a salt of a metal selected from the group consisting of lead, vanadium, chromium, manganese, iron or cobalt.

4,046,814

PREPARATION OF DIKETONES

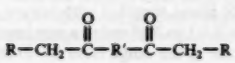
Frank W. Harris, Xenia, and Bruce A. Reinhardt, Dayton, both of Ohio, assignors to Wright State University, Dayton, Ohio

Filed Dec. 18, 1975, Ser. No. 641,959

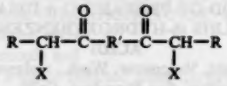
Int. Cl.[2] C07C *49/76, 45/00*; C07D *307/12*; C07C *121/60*; C07D *307/46, 213/50*

U.S. Cl. 260—590 E **8 Claims**

1. The method of preparing a diketone having the formula



wherein R′ is phenyl and R is a radical selected from the group consisting of phenyl, substituted phenyl, pyridyl, and furyl radicals, comprising: (a) reacting a dicarboxylic acid derivative that contains no alpha hydrogens selected from the group consisting of dimethyl terephthalate; terephthaloyl dichloride, dimethyl isophthalate and isophthaloyl dichloride with an active-hydrogen compound selected from the group consisting of ethyl phenylacetate, phenylacetamide, phenylacetonitrile, ethyl 2-pyridylacetate, 4-aminophenylacetonitrile, methyl 4-biphenylacetate, 4-methylphenylacetonitrile, 3-chlorophenylacetonitrile, 5-fluoro-2-nitrophenylacetonitrile, 2-furanacetonitrile and 2-benzimidazolylacetonitrile, said reaction taking place at −100° C to 200° C for 10 minutes to 10 hours and in the presence of a strong base selected from the group consisting of sodium hydride, sodium amide, and sodium triphenylmethyl to form an intermediate having the formula



wherein R and R′ are as defined and X is a nitrile or a carboxylic acid functional group, and (b) hydrolyzing and decarboxylating said intermediate to form said diketone.

4,046,815

PROCESS FOR THE PREPARATION OF TRIARYLBORANE

Nicholas Nazarenko, Orange, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 630,993, Nov. 12, 1975, abandoned. This application May 17, 1976, Ser. No. 687,174

Int. Cl.[2] C07F *5/02*

U.S. Cl. 260—606.5 B **12 Claims**

1. A process for the preparation of an alkali metal hydroxide salt of a triarylborane which comprises reacting under substantially anhydrous conditions alkali metal, an aryl halide and an orthoborate ester at a ratio of halide to ester in the range of about 3.5:1 to about 3:1 in an inert organic liquid solvent having 5–8 carbon atoms and thereafter contacting the reaction products with water to thereby form an alkali metal hydroxide salt of said borane in aqueous medium.

4,046,816

PROCESS FOR PREPARING RESORCINOL MONOETHERS

Werner Heinrich Muller, Aldersbach, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 12, 1975, Ser. No. 586,352

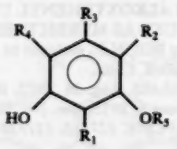
Claims priority, application Germany, June 14, 1974, 2428879

Int. Cl.[2] C07C *41/00*

U.S. Cl. 260—613 R **1 Claim**

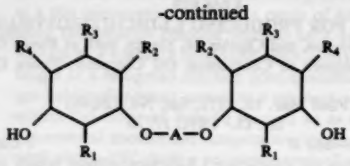
1. A process for the preparation of resorcinol monoalkyl ethers of the general formula I and II:

I



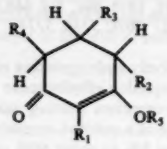
II

-continued

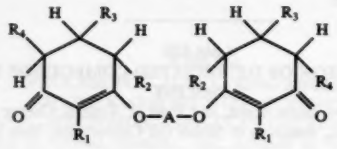


wherein the radicals R_1 to R_4 may be the same or different and each represents a hydrogen, straight chain, branched or cyclic aliphatic radical or an aryl group or araliphatic radical and the radicals R_5 and A stand for straight chain, branched or cyclic aliphatic radical or araliphatic radical which comprise dehydrogenating in a liquid phase using as a liquid a triethylene glycol dialkyl ether or a diethylene glycol dialkyl ether having alkyl groups of up to 6 carbon atoms, at a temperature from 160° to 350° C in the presence of a catalyst containing noble metals of subgroup VIII of the Periodical Table 3-alkoxycyclohexene-(2)-ones of the general formulae I' and II'

I'



II'



wherein R_1 to R_5 and A have the aforesaid meaning.

4,046,817

METHOD OF SYNTHESIS OF PYROGALLOL

Mohammed T. Shipchandler, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Maryland

Continuation-in-part of Ser. No. 490,156, July 19, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,422
Int. Cl.[2] C07C *39/10, 69/38, 69/66*
U.S. Cl. 260—621 R 5 Claims

1. A process for the production of pyrogallol comprising the steps of

a. reacting dialkyl glutarate with dialkyl dialkoxymalonate, said alkyl and alkoxy groups having from 1–6 carbon atoms in about a 1 to 1–2 mole ratio at a temperature of about 25°–150° in the presence of sodium hydride or a sodium alkoxide thereby producing dialkyl-4,6-dihydroxy-5,5-dimethoxy-3,6-cyclohexadiene-1,3-dicarboxylate, and separating same,

b. heating said dialkyl 4,6-dihydroxy-5,5-dimethoxy-3,6-cyclohexadiene-1,3-dicarboxylate in the presence of a strong acid selected from the group consisting of sulfuric, hydrochloric, hydrobromic, trichloroacetic and p-toluene sulfonic acid at a temperature of from about 30° to about 150° C to produce 4,5,6-trihydroxyisophthalic acid, and separating same,

c. heating said trihydroxyisophthalic acid at a temperature of about 190°–210° C to produce pyrogallol.

4,046,818

PURIFICATION OF 3,5-DIALKYLPHENOLS

Gerd Leston, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed June 26, 1975, Ser. No. 590,458
Int. Cl.[2] C07C *37/22, 39/06*
U.S. Cl. 260—627 G 9 Claims

1. A method of purifying 3,5-dialkylphenols from a mixture containing monoalkylphenols and other dialkylphenols wherein the 3,5-dialkylphenol has alkyl groups which are primary or secondary and have a sum total number of carbon atoms greater than 2, comprising:

a. subjecting said mixture to sulfonation with a sulfonating agent selected from the group consisting of sulfuric acid, fuming sulfuric acid, or sulfur trioxide in an amount of at least one mole of sulfonating agent per mole of compound other than 3,5-dialkylphenol present in said mixture and at a temperature in the range of room temperature to 150° C at atmospheric pressure whereby all the compounds in said mixture other than said 3,5-dialkylphenol are converted to sulfonic acids, and

b. separating said sulfonic acids from the unsulfonated 3,5-dialkylphenol to produce a purified 3,5-dialkylphenol.

4,046,819

ALKYLATION OF ALKYL, CYCLOALKYL AND ARALKYL HALIDES

Louis Schmerling, Riverside, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 489,868, July 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 247,082, April 24, 1972, abandoned. This application May 3, 1976, Ser. No. 682,550
Int. Cl.[2] C07C *19/00, 23/10, 25/14*
U.S. Cl. 260—648 R 12 Claims

1. An alkylation process which comprises reacting an olefin containing from 2 to about 9 carbon atoms with a halide reactant selected from the group consisting of a monohaloalkane containing from 3 to about 16 carbon atoms, monohalocycloalkane containing 5 or 6 carbon atoms in the ring and an aralkyl monohalide containing from 2 to about 4 carbon atoms in the alkyl group, said halide reactant containing at least one saturated aliphatic carbon atom which possesses at least one hydrogen atom, said reaction being effected in the presence of a catalytic system consisting essentially of hydrogen chloride and a free radical-generating organic peroxide compound, at reaction conditions which include a temperature in the range of from about 50° to about 300° C. and at least as high as the decomposition temperature of said organic peroxide compound and a pressure of from about atmospheric to about 100 atmospheres, and recovering the resultant monoalkylated halide as the principal product.

4,046,820

STABILIZATION OF 1,1,1-TRICHLOROETHANE

Willis Ray Goodner, Chandler; James Nelson Smith, Tempe, and John Horvath, Chandler, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed June 7, 1976, Ser. No. 693,588
Int. Cl.[2] C07C *17/40*
U.S. Cl. 260—652.5 R 4 Claims

1. A stabilized composition consisting essentially of 1,1,1-trichloroethane and an effective amount of a free radical scavenger selected from the group consisting of trichloroethylene and fluorene which will trap trichloromethyl radicals, making them unavailable for formation of acidic species in said trichloroethane.

4,046,821

OXYCHLORINATION OF HYDROCARBONS IN THE PRESENCE OF NON-HALIDE COPPER CONTAINING CATALYSTS

Louis J. Croce, Seabrook, Tex.; Laimonis Bajars, Princeton, and Maigonis Gabliks, Highland Park, both of N.J., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Continuation of Ser. No. 889,671, Dec. 31, 1969, abandoned. This application May 12, 1975, Ser. No. 576,589
Int. Cl.[2] C07C 17/15
U.S. Cl. 260—654 A 24 Claims

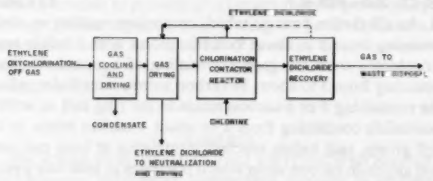
1. In the process of oxychlorination of hydrocarbons comprising contacting in a vapor phase a hydrocarbon, hydrogen chloride or chlorine and oxygen at a temperature range of 200° – 700° C. in the presence of a catalyst wherein the improvement comprises employing a catalyst calcined at 600° – 1100° C consisting of a non-halide copper component consisting of copper and an element selected from the group consisting of O, S. N. P, As, Sn, Pb, Fe, Cr, Mo, W, V, Ti and mixtures thereof and a rare earth compound component, wherein the rare earth is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu and mixtures thereof and the atomic ratio of rare earth to copper is in the range of 4 to 0.1:1.

4,046,822

METHOD FOR RECOVERING ETHYLENE VALUES

Frank Titus Severino, Teaneck, N.J., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 191,975, Oct. 26, 1971, abandoned. This application Nov. 20, 1973, Ser. No. 417,648
Int. Cl.[2] C07C 17/00
U.S. Cl. 260—659 A 6 Claims



1. In a process for preparing ethylene dichloride by oxychlorinating ethylene in which ethylene, hydrogen chloride and an oxygen containing gas are reacted in the presence of an oxychlorination catalyst and where unreacted ethylene values are present in the oxychlorination off-gas; the improvement which comprises recovering the unreacted ethylene values in the oxychlorination process off-gas by the steps of:

a. cooling the off-gas to condense at least part of the water in the off-gas to form a condensed phase and a gaseous phase;

b. separating the condensed phase from the gaseous phase thereby providing a partially dried gaseous phase;

c. contacting the partially dried gaseous phase with ethylene dichloride to further reduce the water content of the partially dried gaseous phase and separating the gaseous phase from the ethylene dichloride;

d. reacting the ethylene in the gaseous phase from step c) with chlorine in the presence of a non-reactive liquid to form ethylene dichloride; and

e. recovering the ethylene dichloride; the water content of said off-gas

being reduced by said cooling, separating and contacting steps to a level such that the water content of the non-reactive liquid is maintained below about 50 parts per million by weight.

4,046,823

PROCESS FOR PRODUCING 1,2-DICHLOROETHANE

Ronnie D. Gordon, and Charles M. Starks, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Mar. 15, 1971, Ser. No. 124,441
Int. Cl.[2] C07C 17/10
U.S. Cl. 260—662 R 7 Claims

1. A process for producing 1,2-dichloroethane which comprises reacting chlorine and ethane in the vapor phase at temperatures in the range of 200° to 500° C in the presence of an alumina supported cupric catalyst promoted with a member selected from the group consisting of KCl and inorganic iron salts, said cupric constituent being selected from the group consisting of $CuCl_2$ and CuO, the mol ratio of chlorine to ethane being in the range of 1:10 to 10:1.

4,046,824

PROCESS FOR SELECTIVE HYDROGENATION OF ETHYLBENZENE

Derek L. Ransley, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 31, 1975, Ser. No. 645,586
Int. Cl.[2] C07C 5/10, 5/14
U.S. Cl. 260—667 14 Claims

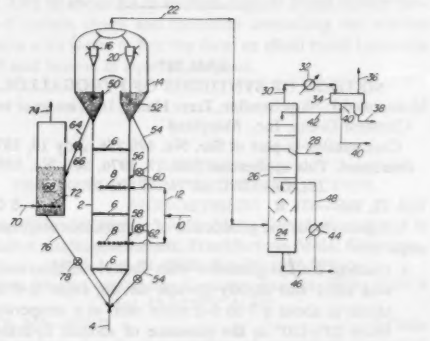
1. A process for selectively hydrogenating ethylbenzene in a C_8 aromatic mixture comprising ethylbenzene and at least one xylene isomer, which comprises heating said mixture with hydrogen in the presence of a catalyst consisting essentially of rhodium until from about 5% to about 60% of said mixture is hydrogenated.

4,046,825

CONVERSION OF OXYGENATED COMPOUNDS TO GASOLINE

Hartley Owen, Belle Mead, and Paul B. Venuto, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 470,084, May 15, 1974, abandoned. This application July 9, 1976, Ser. No. 703,716
Int. Cl.[2] C07C 1/24
U.S. Cl. 260—668 R 18 Claims



1. In the method for chemically reacting aliphatic hetero compounds comprising alcohols, halides, mercaptans, sulfides, amines, ethers and carbonyl compounds under exothermic conditions to form aromatics in the gasoline boiling range by contacting said hetero compounds with catalyst particles comprising a crystalline zeolite selected from a class of crystalline zeolites represented by ZSM-5 crystalline zeolite providing a pore conversion greater than 5 Angstroms, a silica to alumina ratio greater than 12 and a constraint index in the range of 1 to 12, the improvement which comprises:

forming a mixture of said catalyst particles with one of said

hetero compound reactants in a ratio greater than 20 to 1 at a mix temperature within the range of 400° to 900° F;

passing the catalyst reaction mixture as a suspension upwardly at a plurality of spaced apart intervals along the height of a elongated reaction zone containing transverse gas bubble-dispersing means at a reactant residence time within the range of 2 to 10 seconds so as to restrict an incremental exothermic temperature increase not to exceed about 100° during rearrangement of said chemical reactants to higher boiling product compounds and minimize the formation of durene;

separating the suspension into a catalyst phase and a product phase upon discharge from the reaction zone;

recovering said separating from the product phase a gasoline and a higher boiling liquid phase;

recovering the catalyst phase as a dense fluid bed of

catalyst and recycling a major portion thereof to said reaction zone;

passing a minor portion of said recovered dense fluid bed of catalyst to catalyst regeneration when an amount of reactant deposits accumulates on the catalyst requiring removal thereof by burning with oxygen containing gases;

cooling catalyst particles following regeneration thereof when its temperature exceeds about 900° F and passing the cooled catalyst to the inlet of said elongated reaction zone.

4,046,826

PROCESS FOR ALKYLATING AROMATIC HYDROCARBONS WITH SYNTHETIC HECTORITE-TYPE CLAY CATALYST

George E. Stridde, Houston, Tex., assignor to N L Industries, Inc., New York, N.Y.

Division of Ser. No. 530,092, Dec. 6, 1974, Pat. No. 3,979,331, which is a continuation-in-part of Ser. No. 503,985, Sept. 6, 1974, Pat. No. 3,965,043. This application June 21, 1976, Ser. No. 698,104

Int. Cl.[2] C07C *3/52, 15/09*

U.S. Cl. 260—671 C 17 Claims

1. In a process for alkylating in the liquid phase an alkylatable aromatic hydrocarbon with an olefin-acting compound selected from the group consisting of mono-olefins, alkyl bromides, alkyl chlorides, and mixtures thereof, the improvement which comprises contacting said hydrocarbon and said compound under anhydrous alkylating conditions with a catalyst comprising a synthetic hectorite-type clay in which the central octahedral layer contains one or more divalent metals having an ionic radius not greater than 0.75 A, provided that the octahedral layer contains less than 95 mole percent Mg, containing a metallic cation having a Pauling electronegativity greater than 1.0 in cation exchange positions on the surface of said clay.

2. The process of claim 1 wherein said catalyst has the structural formula:

$$[(M_{6-x}^{2+}\,Li_x^{+})^{IV}(Si_8)^{IV}O_{20}(OH)_{4-y}F_y]\,(x/z)R^{z}$$

where

$0.33 \leqq x \leqq 1$

$0 \leqq y \leqq 4$

M is one or more divalent cations having an ionic radius not greater than 0.75 A selected from the group consisting of Mg, Ni, Co, Zn, Mn, and Cu, and

R is at least one metallic cation having a Pauling electronegativity greater than 1.0 of valence z

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4,046,827

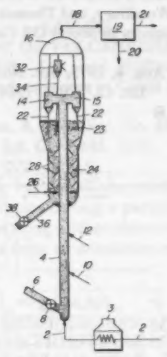
HIGH SELECTIVITY TRANSALKYLATION

Hartley Owen, Belle Mead; Paul B. Venuto, Cherry Hill, and Edward T. Habib, Jr., Mantua, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 26, 1975, Ser. No. 616,966

Int. Cl.[2] C07C *3/62*

U.S. Cl. 260—672 T 20 Claims



1. In a process for effecting transalkylation of an alkylaromatic hydrocarbon compound having from 7 to 10 carbon atoms which comprises contacting said alkylaromatic hydrocarbon compound with a transalkylating agent in the presence of a porous acid-active zeolite catalyst and in the absence of added hydrogen, the improvement wherein said catalyst has a fluid activity index of at least 18 and said contacting is conducted in a fluidized catalyst system reactor under conditions effective for accomplishing said transalkylation including a reactor inlet temperature of between about 300° F and about 1200° F, a reactor pressure of between about 0 psig and about 200 psig, a catalyst/alkylaromatic hydrocarbon compound weight ratio of between about 1 and about 60, a catalyst residence time of between about 0.01 second and about 20 seconds, an alkylaromatic hydrocarbon compound residence time of between about 0.01 second and about 20 seconds and a ratio of catalyst residence time/alkylaromatic hydrocarbon compound residence time of from about 1 to about 2.

4,046,828

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application May 24, 1976, Ser. No. 689,316

The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.

Int. Cl.[2] C07C *5/24*

U.S. Cl. 260—673.5 27 Claims

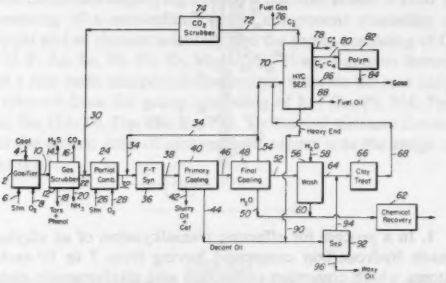
1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt and tin are uniformly dispersed throughout the porous carrier material; wherein the average crystallite size of the tin and catalytically available cobalt is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the tin is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalyti-

cally available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrocyclization conditions or in a mixture of these states.

4,046,829
METHOD FOR IMPROVING THE FISCHER-TROPSCH SYNTHESIS PRODUCT DISTRIBUTION

Henry R. Ireland, Woodbury, and Thomas R. Stein, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,753
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—676 R 1 Claim



1. A method of forming hydrocarbons from carbon monoxide and hydrogen which comprises:

passing carbon monoxide and hydrogen in contact with a Fischer-Tropsch synthesis carbon monoxide reduction catalyst under temperature and pressure conditions promoting the formation of hydrocarbons and oxygenates,

separating the Fischer-Tropsch synthesis product into a hydrocarbon fraction boiling below about 400° F and a hydrocarbon fraction boiling above about 400° F,

passing said hydrocarbon fraction boiling below about 400° F in contact with a crystalline zeolite that has a pore diameter greater than about 5 angstroms; a silica to alumina ratio of at least 12; a constraint index within the range of 1–12; under temperature and pressure conditions promoting the formation of gasoline boiling range products of higher octane rating, passing said hydrocarbon fraction boiling above 400° F sequentially in contact with a hydrogenation catalyst maintained under relatively mild hydrogenation conditions and then in contact with a crystalline zeolite that has a pore diameter greater than about 5 angstroms; a silica to alumina ratio of at least 12; a constraint index within the range of 1–12; maintained under conditions to convert said hydrocarbon fraction to a lower boiling fuel oil product of reduced pour point, and

recovering gasoline boiling range products from each of said crystalline zeolite conversion operations of a higher octane rating than the octane rating of gasoline product of Fischer-Tropsch synthesis.

4,046,830
METHOD FOR UPGRADING FISCHER-TROPSCH SYNTHESIS PRODUCTS

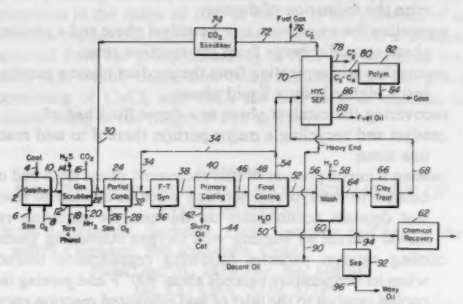
James C. Kuo, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,586
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—676 R 5 Claims

1. A method for upgrading products of Fischer-Tropsch synthesis comprising normally gaseous and liquid hydrocarbons in combination with organic oxygenates which comprises:

cascading the total effluent of a Fischer-Tropsch synthesis operation comprising nitrogen, hydrogen, carbon monoxide, carbon dioxide, methane, water, oxygenates and C_2+ hydrocarbons through a catalyst fines removal zone to a zone containing a crystalline ZSM-5 zeolite conversion catalyst and maintained at an elevated pressure and temperature above 500° F,

recovering a product effluent of said crystalline zeolite conversion operation comprising less organic oxygenates than the Fischer-Tropsch effluent charged therein and a gasoline product of substantially improved octane rating,



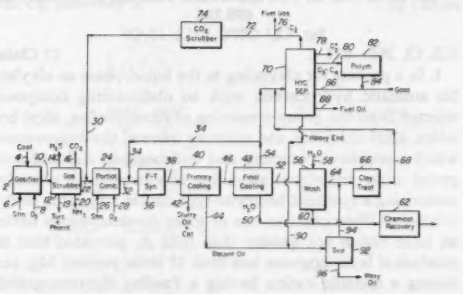
recovering gaseous products of said crystalline zeolite conversion operation comprising C_3 and lower boiling components,

catalytically upgrading said C_3 and lower boiling components to form gasoline boiling components and combining the gasoline boiling components thus formed with the gasoline product of improved octane recovered from said zeolite conversion operation.

4,046,831
METHOD FOR UPGRADING PRODUCTS OF FISCHER-TROPSCH SYNTHESIS

James C. Kuo, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,585
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—676 R 6 Claims



1. A method for upgrading the product effluent of a Fischer-Tropsch synthesis gas operation comprising gaseous hydrocarbons, liquid hydrocarbons and oxygenates which comprises,

cooling the product effluent of Fischer-Tropsch synthesis sufficient to separate a decant oil phase comprising the higher boiling hydrocarbon components of the Fischer-Tropsch effluent from a lower boiling phase comprising gaseous and liquid hydrocarbons and a water phase,

heating the lower boiling phase to a temperature of at least about 500° F and passing the thus heated material in contact with a selective crystalline zeolite conversion catalyst selected from the class of crystalline zeolites represented by ZSM-5 maintained at a temperature within the range of 500° to 850° F,

separating a product effluent of said crystalline zeolite conversion operation under conditions to recover a gaseous phase comprising C_3 and lower boiling material, a water phase and a hydrocarbon phase boiling above said gaseous phase and

separating the hydrocarbon phase obtained from said zeolite conversion operation under conditions to recover LPG gaseous materials, a gasoline product and a light fuel oil product.

4,046,832

CATALYTIC PROCESS FOR THE PREPARATION OF BUTENES FROM PROPYLENE

Edward N. Nowak, Uniontown, and Kenneth J. Frech, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 496,670, Aug. 12, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,879

Int. Cl.[2] C07C *3/62*; B01J *23/22, 23/30*

U.S. Cl. 260—683 D **5 Claims**

1. A method of preparing butenes from propylene which comprises contacting propylene with a catalyst comprising from 3 to 10 percent by weight of V_2O_5 and from 0.1 to 3.0 percent by weight of WO_3 impregnated on a support which has a surface area of 10 to 400 square meters per gram and which is selected from the group consisting of alumina, silica, thoria, zirconia, oxides of titanium, oxides of magnesium and mixtures thereof, which catalyst has been activated by contact with from 0.1 to 10 moles of a trialkylaluminum selected from the the group consisting of aluminum trimethyl, aluminum triethyl, aluminum tripropyl and aluminum triisobutyl per mole of V_2O_5, in which the temperature ranges from about 20 to about 450° C. and the propylene is fed at a GHSV of from about 10 to about 1000.

4,046,833

DEHYDROGENATION OF PARAFFINS

Harley F. Hardman, Lyndhurst, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 22, 1975, Ser. No. 643,463

Int. Cl.[2] C07C *5/18*

U.S. Cl. 260—683.3 **15 Claims**

1. The process for the dehydrogenation of paraffinic hydrocarbons containing from 3 to 6 carbon atoms to the corresponding monoolefins comprising contacting said paraffin with molecular oxygen over a catalyst at a temperature of from about 400° to 700° C, a pressure of from about one atmosphere up to about 3 atmospheres, and wherein the molar ratio of paraffin to oxygen is in the range of from about 1:0.04 to 1:10; said catalyst having the composition:

$$A_aV_bAl_cO_x$$

wherein

A can be one or more of the metals selected from Groups IIA, IIB, VIB, and VIII of the Periodic Table, and

wherein

a is a number from 0 to 3,

b is a number from 0.25 to 5,

c is a number from 0.5 to 25, and

x is a number determined by the valence requirements of the metals of A, vanadium and aluminum,

and wherein said catalyst is heat-treated in the presence of oxygen.

10. The catalyst having the composition:

$$A_aV_bAl_cO_x$$

wherein

A is one or more of the metals selected from the group consisting of magnesium, zinc, chromium, uranium, iron, nickel and cobalt, and

wherein

a is a number from 0.1 to 1.5,

b is a number from 0.5 to 1.5,

c is a number from 1 to 16, and

x is a number determined by the valence requirements of the metals A, vanadium and aluminum;

and wherein said catalyst is heat-treated in the presence of oxygen.

4,046,834

TREATMENT OF VULCANIZED RUBBER

Timothy Charles Philip Lee, and William Millns, both of Shrewsbury, England, assignors to Gould Inc., Rolling Meadows, Ill.

Filed Jan. 8, 1974, Ser. No. 431,623

Int. Cl.[2] C68L *7/00*

U.S. Cl. 260—752 **15 Claims**

1. A finely-divided, vulcanized, recycled rubber comprised predominently of particles having a particle size less than 20 microns, said particles being further characterized by the property of separating out from an admixture with water.

4,046,835

POLYMERS WITH IMIDE GROUPS, AND COMPRISING A POLYESTER FREE FROM ALIPHATIC UNSATURATION

Max Gruffaz, La Mulatiere, and Jean-Louis Locatelli, Vienne, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Mar. 3, 1976, Ser. No. 663,346

Claims priority, application France, Mar. 10, 1975, 75.07381

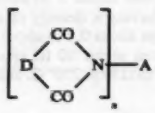
Int. Cl.[2] C08L *77/00*

U.S. Cl. 260—857 PA **4 Claims**

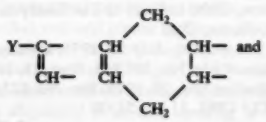
1. A polymer resulting from the reaction of:

a. a polyimide of the formula

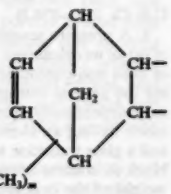
(I)



in which the symbol D represents a divalent radical selected from the class consisting of the radicals



and



where Y represents H, CH_3 or Cl and *m* is 0 or 1, the symbol A represents an organic radical of valency *n* which may contain up to 30 carbon atoms, and *n* represents a number at least equal to 2;

b. a polyamine of the formula

$$(NH_2)_nB \qquad \text{(II)}$$

in which the symbol B represents an organic radical of

valency p which may contain up to 30 carbon atoms, and p represents a number at least equal to 2; and

c. a linear polyester, free from aliphatic unsaturation, and of molecular weight at least equal to 1,500, the amounts of these reactants being such that there are 1.2 to 5 imide groups per NH_2 group, and the polyester represents at least 5% and up to 50% of the weight of the polyimide/-polyamine/polyester combination.

4,046,836

POLYCARBONATE MOLDING MATERIALS

Siegfried Adelmann, Krefeld; Dieter Margotte, Krefeld-Fischeln; Josef Merten, Korschenbroich, and Hugo Vernaleken, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 14, 1976, Ser. No. 648,992

Claims priority, application Germany, Jan. 28, 1975, 2503336

Int. Cl.[2] C08L *69/00, 81/04*

U.S. Cl. 260—860 10 Claims

1. Thermoplastic polycarbonate molding materials based on high molecular weight, aromatic, thermoplastic polycarbonates having molecular weights, M_w, of about 10,000 to 200,000, characterized in that they contain about 0.5 – 50% by weight of a polyphenylene sulphide, based on the total weight of polycarbonate + polyphenylene sulphide.

4,046,837

POLYESTER-POLYOLEFIN BLEND FILM OR COATING COMPOSITION

Max L. Carroll, Jr., Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 293,298, Sept. 25, 1972, abandoned. This application Nov. 5, 1976, Ser. No. 739,370

Int. Cl.[2] C08L *67/00, 23/06*

U.S. Cl. 260—873 3 Claims

1. The composition comprising a blend of poly(tetramethylene terephthalate) having an inherent viscosity in ml./g. of from about 0.6 to about 1.4, with from about 5 to about 35 percent by weight of polyethylene having a density of about 0.918 gm./cc. and a melt index of from about 0.1 to about 10.0, said blend having a flow rate of from about 10 to about 30 gm./10 min. as determined as ASTM D1238 at 250° C. and 2.16 kg.

4,046,838

ADHESIVE COMPOSITIONS OF A BLOCK COPOLYMER AND TACKIFYING RESIN

George W. Feeney, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 490,834, July 22, 1975, abandoned, which is a continuation of Ser. No. 287,946, Sept. 11, 1972, abandoned. This application Oct. 10, 1975, Ser. No. 622,271

Int. Cl.[2] C08L *51/00, 53/00*

U.S. Cl. 260—876 B 3 Claims

1. A pressure sensitive adhesive which comprises a mixture of (a) an unvulcanized elastomeric block copolymer comprised of both non-elastomeric and elastomeric polymer blocks having the general configuration A — B — A wherein each A is an independently selected non-elastomeric styrene polymer block having an average molecular weight of 5000 to 30,000 and a glass transition temperature above about 25° C, the total block A content being from about 10 to about 50 percent by weight of the copolymer, and B is an elastomeric conjugated diene polymer block of 1,3-butadiene having an average molecular weight from about 50,000 to about 500,000 and a glass transition temperature below about 10° C, said copolymer having a tensile strenght at 25° C, in excess of about 200 pounds per square inch, prepared by first polymerizing sytrene with a lithium-based initiator to a polymer of molecular weight in the range of about 5,000 to about 30,000, followed by adding 1,3-butadiene and additional amounts of styrene to the polymerization mixture, and (b) about 20 to about 80 weight percent of a compatible, thermoplastic tackifying resin containing carbon-to-carbon unsaturation therein, based on the total tackifying resin and block copolymer, and characterized by having a softening point in the range of about 70° C to about 110° C consisting essentially of from about 30 to about 55 weight percent units derived from piperylene, from about 20 to about 45 weight percent units derived from 2-methyl-2-butene, from about 20 to about 35 weight percent units derived from dicyclopentadiene and from about 20 to about 35 weight percent units derived from α-methyl styrene prepared by the method which comprises polymerizing said monomers in the presence of aluminum chloride and a solvent selected from aliphatic hydrocarbons and steam stripping the resin product.

4,046,839

COMPOSITIONS HAVING HIGH IMPACT AT LOW RUBBER LEVELS

Stelvio Papetti, Leominster, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.

Division of Ser. No. 370,108, June 14, 1973, abandoned. This application Aug. 29, 1975, Ser. No. 608,934

Int. Cl.[2] C08L *9/08*

U.S. Cl. 260—880 R 13 Claims

1. A process for graft polymerizing a mixture containing styrene and acrylonitrile onto polybutadiene in the form of a latex by effecting the polymerization in the presence of a catalyst and an effective amount of suspending agent wherein the improvement consists essentially of using a polybutadiene latex which has a particle size of about 1500–2500 A, a gel content of about 26–37 % by weight and a swell index of about 85–105.

4,046,840

THERMOPLASTIC POLYMER BLENDS OF AN EPDM POLYMER HAVING A HIGH ETHYLENE LENGTH INDEX WITH POLYETHYLENE

Charles Jerry Carman, Stow; Martin Batiuk, Grafton, and Richard Michael Herman, Elyria, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 23, 1976, Ser. No. 660,319

Int. Cl.[2] C08L *23/16*

U.S. Cl. 260—897 A 7 Claims

1. A thermoplastic polymer blend comprising (1) an EPDM polymer consisting essentially of interpolymerized units of about 67 percent to about 75 percent by weight of ethylene, about 15 percent to about 30 percent by weight of propylene, and from about 0.5 percent to about 10 percent by weight of an alkenyl norbornene monomer; said polymer having an ethylene length index of from about 2.8/1 to about 5/1, a melt endotherm value of about 1 to about 10 calories per gram, and a percent unstretched crystallinity of 0 percent to about 8 percent, and (2) from about 5 parts to about 200 parts by weight per 100 parts by weight of the EPDM polymer, of a polyethylene polymer, said blend containing no crosslinking or curing agents.

4,046,841

PHOSPHONATES CONTAINING PROTECTED KETONE GROUP

Robert Foster; Roger Edwin Preston, and Graham Ernest Robinson, all of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 30, 1976, Ser. No. 718,625

Claims priority, application United Kingdom, Sept. 16, 1975, 38032/75

Int. Cl.[2] C07F *9/40*

U.S. Cl. 260—923 4 Claims

1. A protected ketone derivative of the formula $(R^1O)_2.PO.CH_2.CR^3.CH_2OR^2$, wherein R^1 is C_{1-6}-alkyl, R^2 is 3-chlorophenyl or 3-trifluoromethylphenyl and R^3 is semicarbazono, thiosemicarbazono, oximino, C_{1-6}- alkyloxyimino, hydrazono, C_{1-6}-alkylhydrazono, phenylhydrazono, or phenylhy-

drazono substituted in the phenyl part with one or more substituents selected from halogen, C_{1-3}-alkyl or alkoxy, or nitro.

4,046,842

CASTING OF POLYMERIC FILM

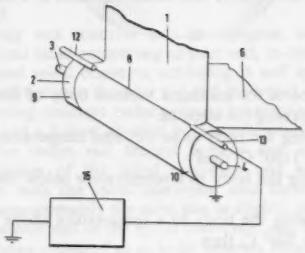
David John Groves, Hitchin, and Albert Mason, Stevenage, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 440,571, Feb. 7, 1974, abandoned, and a continuation-in-part of Ser. No. 336,047, Feb. 26, 1973, abandoned. This application July 28, 1975, Ser. No. 599,935

Claims priority, application United Kingdom, Feb. 7, 1973, 6031/73; Aug. 5, 1974, 34337/74

Int. Cl.² B29D 7/22; H05B 7/00

U.S. Cl. 264—22 **11 Claims**



1. A process for quenching a molten polymeric film, which comprises forming a molten polymeric film and quenching said film on a cooled casting surface which is electrically earthed, the molten film being passed across an electrode located in spaced relation from the film surface and in the proximity of the region of first contact of the molten film and the casting surface, applying an alternating voltage to the electrode, said voltage being an asymmetrical wave form, having positive and negative portions with the positive peak having a greater magnitude than the negative peak, and exceeding 4.0 kilovolts peak to peak, the peak to peak voltage being at least equal to the A.C. corona discharge inception voltage and having a frequency less than that at which positive and negative electrostatic charges alternately emitted by the electrode are unable to cross the space between the electrode and the molten film before the polarity of the voltage on the electrode changes, so as to produce an rms pinning current to the electrode, including leakage current, in the range 0.2 to 20 milliamperes whereby the electrostatic charges emitted by the electrode are deposited by the applied electric field upon the molten film to cause it to adhere to the casting surface.

4,046,843

PROCESS FOR PREPARING MEMBRANES FOR SEPARATION OF SUBSTANCES

Takezo Sano, Takatsuki; Takatoshi Shimomura, Toyonaka, and Masao Sasaki, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 20, 1975, Ser. No. 606,005

Claims priority, application Japan, Sept. 5, 1974, 49-102806

Int. Cl.² B29H 7/20

U.S. Cl. 264—22 **24 Claims**

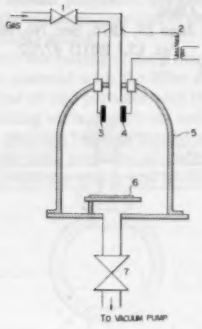
1. A process for preparing a membrane for separation of substances which comprises:

a. dissolving a water-insoluble high polymer, and a water-soluble high polymer and/or a water-soluble surfactant in a proportion of 0.1 to 3 parts by weight of water-soluble high polymer and/or surfactant with 1 part by weight of the water-insoluble high polymer, in an organic solvent;

b. casting said solution to form a shaped article;

c. evaporating said organic solvent;

d. exposing the thus formed shaped article to a plasma to crosslink the surface; and



e. subsequently removing uncrosslinked water-soluble high polymer and/or surfactant by washing with water.

4,046,844

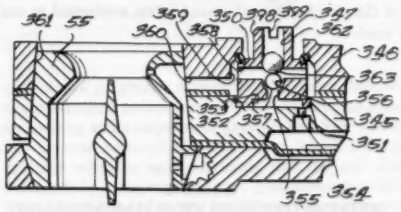
CARBURETOR CONSTRUCTION

Paul Ellis Rickert, Oregon, Ohio, assignor to Borg-Warner Corporation, Chicago, Ill.

Filed June 30, 1976, Ser. No. 701,386

Int. Cl.² F02M 17/04

U.S. Cl. 261—34 A **11 Claims**



1. A carburetor construction comprising:

a base plate having a substantially planar surface including an opening adapted for connection to an air inlet passage of an internal combustion engine, said opening defining a socket and said planar surface including a groove extending transversely with respect to said socket;

a throat member defining a fuel-air mixing passage mounted on said base plate having a mixture outlet portion thereof in alignment with said opening in said base plate, said throat member having an air inlet portion spaced from said mixture outlet portion and including fuel aperture means extending through a wall portion thereof between said air inlet portion and said mixture outlet portion, said throat member being received within said socket and including a pair of oppositely disposed slots aligned with said groove;

a rotatable throttle shaft extending through said slots and journalled in said groove, said throttle shaft including a throttle plate disposed in said mixture outlet portion of said throat member providing a variable restriction in said mixing passage; and

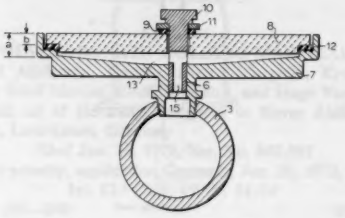
a fuel module mounted on said base plate receiving said throat member including fuel channel means arranged and disposed for communication with a source of fuel and with said aperture means in said throat member, said base plate, throat member and fuel module being secured in interlocking engagement.

4,046,845

AIR DIFFUSER ELEMENT

Richard K. Veeder, Pittsford, N.Y., assignor to Ferro Corporation, Cleveland, Ohio

Filed June 23, 1976, Ser. No. 698,933
Int. Cl.² B01D 47/02
U.S. Cl. 261—122 6 Claims



1. An improved unitary diffuser element adapted for assembly into an air diffuser head for diffusing air into liquids, said diffuser head having a substantially enclosed air chamber therewithin, the improved diffuser element having exterior and interior faces generally opposed and spaced apart, said exterior face being substantially planar, both faces having generally coincident outlines conforming to, and circumscribed by, an integral, peripheral annular zone, said zone having a greater, substantially non-permeable, density than the balance of a said diffuser element, though compositionally identical to the balance of said element, the interior face of said element forming part of the air chamber aforesaid when assembled in said diffuser head.

4,046,846

METHOD OF PRODUCING HARD FOAMED MATERIALS

Tokuzo Fujimori, No. 167, Fukuichi, Yonago, Totori, Japan

Filed Aug. 14, 1974, Ser. No. 497,297
Claims priority, application Japan, Sept. 1, 1973, 48-98370
Int. Cl.² B29D 27/00
U.S. Cl. 264—45.3 5 Claims

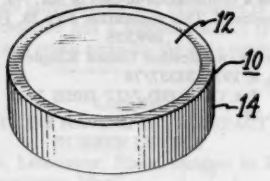
1. In the method of producing hard foamed objects of expanded vinyl chloride resin which comprises forming a mixture comprised of said vinyl chloride resin and a blowing agent; introducing the mixture into a mold; pressurizing the mold while heating the mold to cause the blowing agent to partially expand the resulting resin mixture to fill said mold; cooling said mold; removing the resulting object from said mold and then heating the object to further expand its size without changing its shape, the improvement which comprises: forming a dry mixture of said resin with about 0.4 to about 40 times by weight of the resin of a powdery inorganic filler, adding to the dry mixture at least about 30 parts by weight of said mixture of a solvent selected from toluene and xylene, kneading the solvent, resin and inorganic filler containing mixture in a closed kneader at about 40° to about 100° C until the outer surfaces of the particles of said inorganic filler are covered with said resin and are adhered to each other by said resin, adding a blowing agent comprised of liquid butane, and an additional amount of about 30 to about 40 parts by weight of said solvent, thoroughly mixing the resulting mixture so that all the ingredients including the liquid butane are thoroughly dispersed and then introducing said mixture into said mold.

4,046,847

PROCESS FOR IMPROVING THE STABILITY OF SINTERED ZINC OXIDE VARISTORS

James S. Kresge, Pittsfield, Mass., assignor to General Electric Company

Filed Dec. 22, 1975, Ser. No. 643,541
Int. Cl.² H01B 1/08; C01G 9/02
U.S. Cl. 264—61 5 Claims



1. A process for making a varistor body of the zinc oxide type, comprising the steps of:

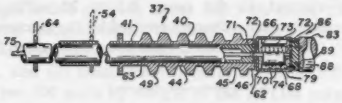
a. sintering the body at an elevated temperature of at least about 1100° C; then
b. cooling the body to a temperature below about 400° C; then
c. reheating the body to a temperature above 400° C but below 700° C; then
d. recooling the body slowly to a temperature below about 400° C, and then
e. repeating at least once the sequence of the reheating step (c) and then recooling step (d).

4,046,848

EXTRUSION MACHINE FOR MAKING ARTICLES OF CEMENT-LIKE MATERIAL

George Putti, North Vancouver, Canada, assignor to Dyform Concrete (Prestressed) Ltd., Vancouver, Canada

Continuation of Ser. No. 310,791, Nov. 30, 1972, abandoned, which is a division of Ser. No. 69,300, Sept. 30, 1970, Pat. No. 3,877,860, which is a division of Ser. No. 882,039, Dec. 4, 1969, abandoned. This application Nov. 11, 1974, Ser. No. 522,920
Int. Cl.² B28B 1/08
U.S. Cl. 264—70 7 Claims



1. A method of making a cured slab of concrete comprising the steps of:

introducing wet concrete into an elongate, substantially horizontal mold comprising an inlet end, an outlet end, an elongated spiral conveyor extending in and spaced from the mold between the inlet end and the outlet end thereof for moving concrete under pressure longitudinally of said mold, and a former element in the mold positioned adjacent the outlet end thereof beyond and immediately downstream of the spiral conveyor and substantially aligned with the spiral conveyor, said former element being approximately the same size or slightly less than the downstream end of the spiral conveyor, said former element being mounted so as to be rotated independently of the spiral conveyor, the cross sectional area of said mold being less at said outlet end than at said inlet end and progressively decreasing in cross-section substantially from the inlet end to the end of the spiral conveyor

whereby said concrete is packed under pressure around said former;

forcing the concrete along the spiral conveyor by rotating it to force the concrete onto the former at a progressively increasing pressure as a result of the progressively increasing radial restraint of the mold at the former because of the progressively decreasing cross-sectional area of the mold substantially from the inlet end to the former,

said forcing step including extruding the concrete out through the outlet and against the previously formed concrete to move the mold in a direction away from said formed concrete, and

rotating the former during said forcing step independently of the speed or direction of rotation of the spiral conveyor so as to select a speed for optimizing the properties of the interior surface of the core.

5. A method of making a cured slab of concrete comprising the steps of:

introducing wet concrete into an elongate, substantially horizontal mold comprising an inlet end, an outlet end, an elongated spiral conveyor extending in and spaced from the mold between the inlet end and the outlet end thereof for moving concrete under pressure longitudinally of said mold, and a former element in the mold positioned adjacent the outlet end thereof beyond and immediately downstream of the spiral conveyor and substantially aligned with the spiral conveyor, said former element being approximately the same size or slightly less than the downstream end of the spiral conveyor, said former element being mounted so as to be separate from and rotatable independently of the spiral conveyor, the cross-sectional area of said mold being less at said outlet end than at said inlet end whereby said concrete is packed under pressure around said former;

forcing the concrete along the spiral conveyor by rotating it to force the concrete onto the former at a progressively increasing pressure as a result of the progressively increasing radial restraint of the mold at the former because of the smaller cross-sectional area of the mold at the former as compared with the cross-sectional area at the spiral conveyor,

said forcing step including extruding the concrete out through the outlet and against the previously formed concrete to move the mold in a direction away from said formed concrete, and

including the further step of vibrating the concrete in the mold at a high frequency with a vibrator located within said separated former element such that its high frequency vibrations are imparted to the concrete at said location whereat the concrete is packed under pressure around the former, and wherein the concrete upstream from the former is substantially free of said high frequency vibrations.

4,046,849

METHOD OF COMPOUNDING THERMO-PLASTIC POLYMERIC MATERIALS AND FILLERS AND EXTRUDING ONTO ELECTRICAL CONDUCTORS

Ray Clarence Lever, Fairfield, and Edward Vincent Wilkus, Trumbull, both of Conn., assignors to General Electric Company, New York, N.Y.

Division of Ser. No. 273,156, July 19, 1972, Pat. No. 3,997,494. This application July 29, 1974, Ser. No. 492,965

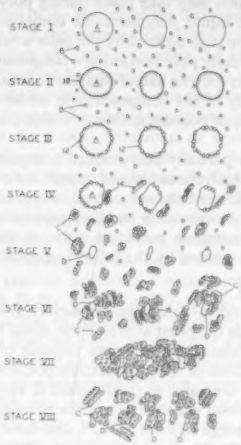
Int. Cl.[2] B29F *3/10*

U.S. Cl. 264—174 **15 Claims**

1. The method of manufacturing an electrically insulated conductor having an insulation of a compound comprising thermoplastic polymeric material and filler, comprising the steps of:

a. mixing particles of thermoplastic polymeric material with particulate filler proportioned in amounts ranging from at least 5 to about 200 parts by weight of the filler per 100 parts by weight of the polymeric material while melting surface portions of the particles of polymeric material, whereby the filler is blended with the melting surface portions of said polymeric particles and the resultant blend of the melted polymeric material and filler is removed from the remaining portion of the polymeric particles by the mixing action;

b. continuing both the mixing of the particles of thermoplastic polymeric material with the filler and the melting of surface portions of said particles with the resulting blending of the melting surface portions and filler and the removal of the resultant blend of melted polymeric material and filler from said particles of polymeric material to effect a progressing melting and diminution of the said



particles of polymeric material until greater than 50 % of the particulate polymeric material has become expended by melting and a majority of greater than 50% of the filler has become substantially assimilated into the polymeric material whereby said polymeric material and filler are substantially compounded to a free flowing particulate from comprising discrete particles of the compounded blend of polymeric material and filler with said blend comprising fundamental units predominantly structure essentially of a stratified layer of the filler adhesively embraced by a film-like mass of polymeric material; and,

c. extruding the resultant compound about a core of metallic electrical conductor.

4,046,850

CONTINUOUS CASTING OF A POLYMERIZABLE COMPOSITION BETWEEN MOVING ENDLESS BELTS

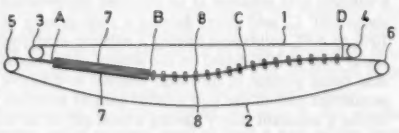
Yasuyuki Kato; Masahiko Moritani, and Seiichi Suzuki, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 24, 1974, Ser. No. 517,617

Claims priority, application Japan, Oct. 25, 1973, 48-120517

Int. Cl.[2] B29D *7/02*

U.S. Cl. 264—216 **11 Claims**



1. A process for continuously casting a liquid polymerizable composition which comprises:

1. feeding the liquid polymerizable composition into a spacing defined between a pair of moving metal endless belts

having thicknesses in the range of from 0.1 to 3 mm. which are arranged such that the lower run of the upper belt is disposed above the upper run of the lower belt and the runs are caused to move concurrently with each other in the same direction at substantially the same speed;

2. feeding a pair of continuous gaskets into the spacing together with the liquid polymerizable composition, in such a manner that the gaskets travel between and in contact with the opposing surfaces at the opposite edges of the belts to form a pair of seals and define a cavity between the surfaces and the seals, and wherein the belts are provided with a mechanism for adjusting the cavity in response to variation in volume of the composition which may take place during polymerization;

3. passing the liquid polymerizable composition through a region of the path defined by the belts where said composition is partially polymerized at a temperature of from 50° to 150° C. to such an extent that the common logarithm of the viscosity of the composition in terms of poise at the temperature of polymerization is within the range of from 2 to 5;

4. passing the partially polymerized composition through a region in which the lower and upper runs of the respective upper and lower belts are curved in opposite directions at least twice downwardly and then upwardly or vice versa through a common inflection point at the radius of the curves represented by the following equation:

$$R = K \times L$$

where R is the radius of curvature in meters; L is the horizontal distance between the point at which the initial curvature starts and the point where a mechanism capable of following the variation of volume of the polymerized composition ends; and K is a constant; the value of the constant K varying depending upon the horizontal distance L and the number of curves and being within a range of from 0.5 to 5, and the runs are brought closer together as the composition passes through the spacing between the belts, whereby contact of the composition with the respective lower and upper runs of the upper and lower belts is maintained during the polymerization and subsequent volume variation of said composition and while the polymerization is completed; and

5. removing the resulting rigid plate of the polymerized composition from the belts at the side opposite to the feed side of the moving belts.

4,046,851

TWO STAGE SULFURIC ACID LEACHING OF SEA NODULES

Kohur Nagaraja Subramanian, Mississauga, and Gerald Vernon Glaum, Oakville, both of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed June 21, 1976, Ser. No. 697,957

Claims priority, application Canada, July 30, 1975, 232547

Int. Cl.² C01G 3/10, 51/10, 53/10

U.S. Cl. 423—41 **11 Claims**

1. A two-stage process for treating manganiferous sea nodules containing acid soluble gangue minerals, a major amount of manganese and iron, and a minor amount of at least one of the nonferrous metals nickel, cobalt, and copper, for the selective extraction of said nonferrous metal values comprising:

a. effecting a first stage leach of raw sea nodules slurried in a sulfuric acid medium at an elevated temperature up to about 100° C, said slurry having a pulp density of about 10% to 40% solids and having a sulfuric acid content of about 20% to 50% based on the weight of the nodules, the acid being present in sufficient amount to dissolve a preponderant part of the acid soluble gangue minerals and to obtain a resultant slurry having a final pH of no less than about 1.5, and

b. effecting a second stage leach of the resultant nodules of the first stage leach in the resultant leach solution of the first stage leach at a temperature in the range of above about 100° C up to about 260° C at an initial pH no lower than about 1.5 to extract nickel, cobalt and copper from said nodules; whereby said nickel, cobalt and copper values are extracted from said nodules with reduced tendency for scale formation.

4,046,852

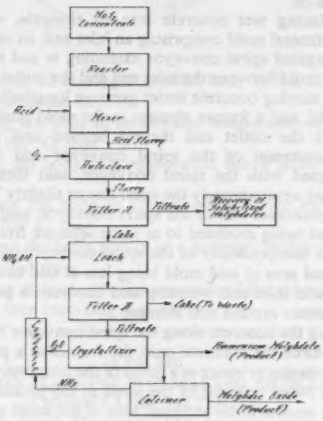
PURIFICATION PROCESS FOR TECHNICAL GRADE MOLYBDENUM OXIDE

Michael A. Vertes, Weston, Conn.; Richard A. Ronzio, Golden, Colo., and Tommy C. Kearns, Argyle, Iowa, assignors to Amax Inc., Greenwich, Conn.

Filed May 19, 1976, Ser. No. 687,675

Int. Cl.² C01G 39/00

U.S. Cl. 423—58 **10 Claims**



1. A process for producing a high purity alkali molybdate product from an impure molybdenite concentrate which comprises the steps of providing an impure particulated molybdenite feed material consisting predominantly of MoS_2, oxidizing said feed material to convert substantially all of the MoS_2 to molybdenum oxide, mixing the oxidized said feed material with an aqueous acid solution to form a slurry containing from about 5% up to about 40% solids, said acid solution containing a mineral acid selected from the group consisting of sulfuric acid, nitric acid, hydrochloric acid and mixtures thereof wherein said acid is present in an amount in stoichiometric excess of that required to react with the contaminating metals and metal compounds present in said feed material, autoclaving said slurry at a temperature of from about 150° C to about 350° in the presence of a free oxygen partial pressure of at least about 100 psi for a period of time sufficient to convert the predominant portion of molybdenum compounds present in said feed material to molybdenum trioxide and a conversion of the predominant portion of contaminating metal sub-molybdate compounds present to aqueous acid solution soluble compounds, subjecting the autoclaved said slurry to a separation treatment to recover the solids from said acid solution, treating the separated said acid solution to remove and recover the major portion of dissolved molybdate anions therein, leaching the recovered said solids with an aqueous alkali hydroxide solution to effect a conversion of the molybdic oxide constituents therein to soluble alkali metal molybdate compounds, separating said aqueous alkali hydroxide solution containing the solubilized alkali metal molybdate compounds from the remaining insoluble residue, and recovering the alkali metal molybdate compounds from said aqueous alkali hydroxide solution as a high purity alkali metal molybdate product.

4,046,853

PRODUCTION OF TITANIUM TETRACHLORIDE

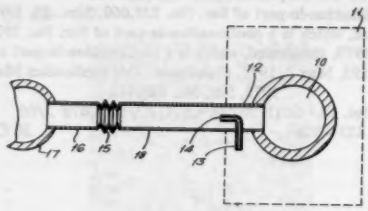
Michael Robinson, Grimsby, England, assignor to Laporte Industries Limited, London, England

Filed June 15, 1976, Ser. No. 696,280

Claims priority, application United Kingdom, July 4, 1975, 28175/75

Int. Cl.[2] C01G 23/02, 23/04

U.S. Cl. 423—77 15 Claims



1. A process for the production of titanium tetrachloride from an iron-containing titaniferous ore, which comprises;

chlorinating said ore in a fluidized bed of a mixture of the ground ore and a carbonaceous material to obtain an effluent gas which comprises a mixture of titanium tetrachloride and iron chlorides in the vapor state, more than 50 percent of said iron chlorides being ferrous chloride;

oxidizing from 65 to 95 percent of the ferrous chloride in said effluent gas by mixing with the effluent gas a proportion of oxygen sufficient to oxidize any carbon blow-over from the fluidized bed and from 65 to 95 percent of the ferrous chloride in said effluent gas while maintaining the temperature of the effluent gas-oxygen mixture above the dew point of the ferrous chloride but below about 1075° C., whereby the oxidized effluent gas contains ferric oxide and ferric chloride as the predominant iron chloride component;

moving the mixture of gases resulting from oxidizing, in a stream having a velocity sufficient to entrain particles of the ferric oxide formed, to a particle separation zone;

separating ferric oxide and any residual ferrous chloride and ferric chloride from the moved mixture of gases to obtain a residual gas containing titanium tetrachloride vapor; and

condensing said titanium tetrachloride vapor from said residual gas.

4,046,854

RECOVERY OF TITANIUM TETRACHLORIDE

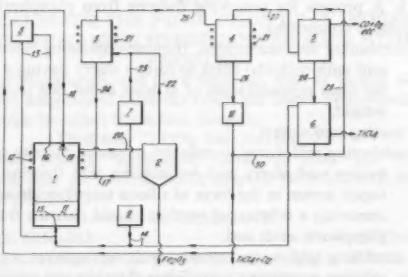
John Dunderdale, Grimsby, England, assignor to Laporte Industries Limited, London, England

Filed June 15, 1976, Ser. No. 696,361

Claims priority, application United Kingdom, July 4, 1975, 28176/75

Int. Cl.[2] C01G 23/02, 49/06

U.S. Cl. 423—77 16 Claims



16. A process for the recovery of titanium tetrachloride by separating it from iron chloride contained in an effluent; the effluent comprising a gaseous mixture of titanium tetrachloride and iron chloride which is predominantly in the form of ferric chloride, and resulting from a process comprising the steps of continously feeding into a fluidised bed reactor solids comprising 60% to 80% by weight of ilmenite ore and from 20% to 40% by weight of coke; maintaining the solids in the fluidised state by means of a fluidising gas comprising from 75% to 100% by volume of chlorine, from 0% to 15% by volume of an inert gas and from 0% to 10% by volume of oxygen, maintaining the temperature of the fluidised solids in the range from 850° C to 1000° C and controlling the rate of feed of solids to maintain the level of the surface of the fluidised solids at a point in the lower half of the reactor, the separation of the titanium tetrachloride being effected by passing the effluent from the surface of the fluidised bed upwardly through the upper half of the reactor, while cooling it to a temperature in the range from 500° C to 800° C by incorporating liquid titanium tetrachloride therein, mixing the cooled effluent at or near the top of the reactor, with oxygen in a quantity 5% to 100% in excess of the quantity required in theory to oxidise the ferric chloride content of the effluent to produce particles of ferric oxide, the velocity of the resulting mixture of the remaining gases of the effluent, oxygen and chlorine being sufficient to entrain the said particles, removing the said mixture and entrained particles from the reactor, adjusting the temperature of the removed mixture firstly to above 250° C but low enough to solidify any calcium or magnesium chlorides which may be present therein and removing ferric oxide particles and any resulting solid calcium or magnesium chlorides; further cooling the mixture to a temperature in the range from 250° C to 130° C to solidify any residual ferric chloride, removing any resulting particles of ferric chloride from the mixture; further cooling the mixture to below 130° C to condense titanium tetrachloride therefrom, recovering the condensed titanium tetrachloride; recovering residual chlorine from the remaining vapours by selective absorption in titanium tetrachloride followed by desorption, and recycling the receovered chlorine into the fluiding gas, incorporating residual ferric chloride in the solids in the fluidised bed reactor and utilising a proportion of the liquid titanium tetrachloride recovered to cool the effluent from the fluidised bed.

4,046,855

METHOD FOR REMOVING HARMFUL ORGANIC COMPOUNDS FROM ALUMINATE LIQUORS OF THE BAYER PROCESS

Bernhard Schepers, Speyer (Rhine); Gerhard Bayer, Rheingonheim; Ernst Urmann, Ludwigshafen (Rhine), and Klaus Schanz, Limburgerhof, all of Germany, assignors to Gebruder Giulini GmbH, Ludwigshafen (Rhine), Germany

Filed Apr. 14, 1976, Ser. No. 676,883

Claims priority, application Germany, Apr. 25, 1975, 2518431

Int. Cl.[2] C01F 7/00, 7/46

U.S. Cl. 423—130 10 Claims

1. A method for removing harmful discoloring organic compounds from an aluminate liquor obtained in the production of alumina according to the Bayer process where bauxite is decomposed in a digester, comprising:

a. adding a magnesium compound to the aluminate liquor, the magnesium compound being a compound which reacts with the aluminate liquor to form a hydroxide mixture containing magnesium hydroxide and aluminum hydroxide which precipitates from the aluminate liquor;

b. maintaining the precipitated mixture in the aluminate liquor, while stirring, until at least a part of the harmful discoloring organic compounds have been eliminated from the aluminate liquor; and

c. then separating the hydroxide mixture containing said harmful discoloring organic compounds from the aluminate liquor.

4,046,856

METHOD FOR REMOVING SULFUR OXIDE FROM STACK GAS

Hayami Itoo; Noriaki Takahashi, both of Kobe, and Hiromasa Kouda, Akasi, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 15, 1974, Ser. No. 451,394
Int. Cl.[2] C01F *1/00, 5/40, 11/46;* C01B *17/00*
U.S. Cl. 423—166 4 Claims

1. A method for removing sulfur oxides from stack gas as gypsum comprising the steps of:

adding $Mg(OH)_2$ to an absorbent comprising predominantly at least one calcium compound;

absorbing the sulfur oxides in the absorbent whereby the sulfur oxides are converted to the sulfite form in a slurry;

oxidizing the resulting sulfite to form a slurry composed essentially of gypsum and supernatant liquid containing as the main component $MgSO_4$;

maintaining the pH of the slurry produced in the oxidizing step under 5 to produce a good quality gypsum;

separating the gypsum from the supernatant liquid to recover the gypsum as a product; and

double decomposing the supernatant liquid in the presence of $Ca(OH)_2$ to produce $CaSO_4$ and regenerate the $Mg(OH)_2$ which is added to the absorbent to recirculate almost all the magnesium in the system, the molar ratio of Ca.Mg supplied to the absorbent being 0.5 to 99.0.

4,046,857

CONTINUOUS PROCESS FOR THE PRODUCTION OF PHOSPHONITRILIC CHLORIDES

Thomas M. Fekete, Yardley, Pa., and John F. Start, Mercerville, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 484,857, July 1, 1974, abandoned. This application May 19, 1975, Ser. No. 578,631
Int. Cl.[2] C01B *25/10*
U.S. Cl. 423—300 11 Claims

1. A continuous process for the production of polymeric phosphonitrilic chlorides which comprises:

a. continuously feeding phosphorus pentachloride in an inert solvent into the first of two reaction zones;

b. concomitantly feeding ammonia continuously into at least the first of the two reaction zones;

c. maintaining the phosphorus pentachloride and ammonia reactants in the first reaction zone at a temperature of 100° to 120° C;

d. continuously transferring the reaction mixture from the first reaction zone to the second reaction zone maintained at a temperature of 125° to 180° C;

e. feeding the ammonia to the first reaction zone at a ratio of at least 0.33 moles per mole of phosphorus pentachloride with the total ammonia introduced in the process being between 1.01 and 1.20 moles of ammonia per mole of phosphorus pentachloride; and

f. continuously withdrawing phosphonitrilic chloride polymer from the second reaction zone.

4,046,858

SYNTHESIS FOR CRYSTALLINE HYDROXYAPATITE

John J. Barsa, 133 Blaisdell Road, Orangeburg, N.Y. 10962; Edward T. Farris, 2541 Sweetbriar Road, Dallas, Tex. 75228, and Richard J. Lagow, 21 Magnolia Ave., Manchester, Mass. 00144

Filed July 24, 1974, Ser. No. 491,581
Int. Cl.[2] C01B *15/16, 25/26*
U.S. Cl. 423—305 4 Claims

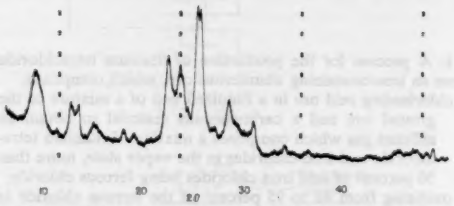
1. A process for preparing crystalline hydroxyapatite comprising contacting a source of calcium ions with about a stoichiometric amount of anhydrous trisodium phosphate in a combination solvent comprising from about 10 to about 75 weight percent of a polar, aprotic organic solvent and from about 25 to about 90 weight percent of water and thereafter recovering said crystalline hydroxyapatite.

4,046,859

CRYSTALLINE ZEOLITE AND METHOD OF PREPARING SAME

Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, both of N.J., and Mae K. Rubin, Bala Cynwyd, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 528,060, Nov. 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 393,767, Sept. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 358,192, May 7, 1973, abandoned. This application Mar. 20, 1975, Ser. No. 560,412
Int. Cl.[2] C01B *33/28;* C07C *87/30;* C07F *5/06*
U.S. Cl. 423—328 20 Claims



1. A synthetic crystalline aluminosilicate zeolite having a composition in the anhydrous state, expressed in terms of mole ratios of oxides as follows:

$$(0.3\text{–}2.5)R_2O : (0\text{–}0.8)M_2O : Al_2O_3 : > 8\ SiO_2$$

wherein R is an organic nitrogen-containing cation derived from a 2-(hydroxyalkyl)trialkylammonium compound and M is an alkali metal cation and having an X-ray powder diffraction pattern substantially the same as that shown in Table 1A of the specification, the sorption capacity of said zeolite after calcination at 600° C being characterized by the ratio of normal hexane sorption to 2-methylpentane sorption at 90° C of less than 10.

4,046,860

AMMONIUM FLUORIDE PROCESS FOR DEFLUORINATING PHOSPHORIC ACIDS AND PRODUCTION OF AMMONIUM FLUOSILICATE

Gustave E. Kidde, 294 California Terrace, Pasadena, Calif. 91105

Division of Ser. No. 359,765, May 14, 1973, Pat. No. 3,907,973, which is a continuation-in-part of Ser. No. 231,826, March 6, 1972, abandoned. This application June 4, 1975, Ser. No. 583,584
Int. Cl.[2] C01B *25/18, 33/20;* C01C *1/00*
U.S. Cl. 423—341 8 Claims

1. A process for removing fluorine from phosphoric acid solutions comprising;

combining unconcentrated, fluorine-containing phosphoric acid with colloidal silica to form a slurry having a colloidal silica concentration of at least about one percent by weight;

heating said slurry;

subjecting said slurry to reduced pressures thereby concentrating said slurry and volatilizing said fluorine into a vapor stream in the form of silicon tetrafluoride and thus removing a substantial portion of said fluorine from said phosphoric acid; and

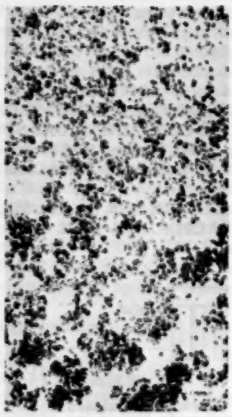
scrubbing said vapor stream with an aqueous scrubbing solution containing ammonium fluoride and additionally contains ammonium fluosilicate, to thereby convert said silicon tetrafluoride to ammonium fluosilicate.

4,046,861

PROCESS FOR THE PRODUCTION OF FERROCYANIDE BLUE

Helmut Reinhardt, Rodenkirchen; Everhard Gratzfeld, Wesseling, and Eva Clausen, Rodenkirchen, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Oct. 7, 1975, Ser. No. 620,273
Claims priority, application Germany, Nov. 8, 1974, 2453014
Int. Cl.² C01C *3/12*
U.S. Cl. 423—367 14 Claims



1. In a process for the production of ferrocyanide blue by reaction of an aqueous ferrocyanide solution with an iron II salt and thereafter aging the precipitate at elevated temperature and oxidizing the aged precipitate to form ferrocyanide blue, the improvement comprising simultaneously introducing an aqueous solution of ferrocyanide consisting of a mixture of sodium and potassium ferrocyanides and an aqueous solution of the ferrous II salt into a water receiver containing water in an amount of 20 to 40 weight % based on the weight of the entire suspension formed to thereby provide optimum mixing and to form a suspension of the precipitate of ferrocyanide white in the resulting aqueous reaction medium, and aging the precipitate in the reaction medium in the presence of the salts formed in the reaction.

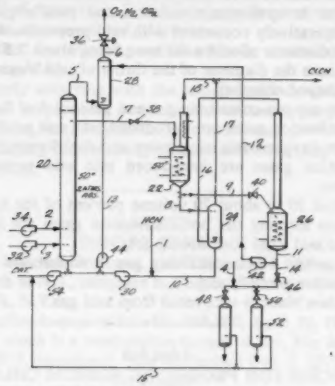
4,046,862

PROCESS FOR THE PRODUCTION OF CYANOGEN CHLORIDE USING HYDROGEN PEROXIDE WITH PRESSURE

Werner Heimberger, and Gerd Schreyer, both of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed May 7, 1976, Ser. No. 684,352
Claims priority, application Germany, May 15, 1975, 2521581; May 15, 1975, 2521582; May 12, 1975, 2521012; May 12, 1975, 2521013
Int. Cl.² C01B *21/18*
U.S. Cl. 423—383 25 Claims

1. In a process for the production of cyanogen chloride or cyanogen bromide by reaction of (1) hydrogen cyanide with (2) hydrogen chloride or hydrogen bromide, and (3) hydrogen peroxide, in aqueous medium, in the presence of cupric ions and ferric ions as catalysts, the improvement comprising carrying out the reaction at a pressure of 1.5 to 16 bar and recovering the cyanogen chloride or cyanogen bromide free from oxygen and nitrogen.



4,046,863

PROCESS FOR THE PRODUCTION OF SHAPED ARTICLES OF HIGH DENSITY GRAPHITE

Kazuo Kobayashi, Kurume; Ichitaro Ogawa, Yame; Hidemasa Honda, Tosu, and Yasuhiro Matsushita, Higashiosaka, all of Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Aug. 4, 1975, Ser. No. 601,609
Claims priority, application Japan, Aug. 29, 1974, 49-99622
Int. Cl.² C01B *31/04*
U.S. Cl. 423—448 4 Claims

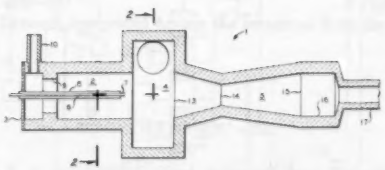
1. A process for producing shaped articles of graphite having a density of at least about 2.0 comprising the steps of forming a generally uniform mixture of finely divided amorphous carbon or synthetic graphite and boric acid or boron oxide in an amount equal to about 3–30% by weight of the mixture, shaping said mixture into a given shape, and baking the mixture in the absence of a pitch binder to a temperature of at least about 2000° C while under a pressure of at least about 100 kg/cm².

4,046,864

PROCESS TO PRODUCE CARBON BLACK

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 25, 1974, Ser. No. 526,981
Int. Cl.² C09C *1/50*
U.S. Cl. 423—450 7 Claims



1. A carbon black process wherein

a. a hydrocarbon feedstock liquid under normal conditions is axially introduced into a tubular reactor comprising

an axial zone;

an enlarged precombustion zone having a larger internal diameter than the axial zone in open communication

and axial alignment operatively connected with said axial zone;

a reaction zone formed as a Venturi nozzle-shaped chamber in open communication and axial alignment and operatively connected with said precombustion zone;

the diameter of said axial zone being about 1.5 to about 3 times the diameter of the throat of said Venturi nozzle-shaped chamber,

b. free oxygen-containing gas and gaseous fuel forming hot combustion gases are introduced into said axial zone;

c. free oxygen-containing gases and fuel forming hot combustion gases are introduced into said precombustion zone;

d. about 10 to about 70 volume percent of the total of the gases forming the hot combustion gases are introduced into said axial zone in step (b);

e. a carbon black-containing gas is withdrawn from said reaction section; and

f. carbon black is recovered from said gas.

4,046,865

PROCESS FOR PRODUCING SODIUM CHLORIDE BRINES SUITABLE FOR ELECTROLYSIS

Rolf Schafer, Krefeld-Uerdingen, Germany, assignor to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 451,993, March 18, 1974, abandoned. This application Nov. 22, 1976, Ser. No. 744,088

Claims priority, application Germany, Mar. 22, 1973, 2314255

Int. Cl.² C01D *3/06*

U.S. Cl. 423—499 **5 Claims**

1. In the process for producing sodium chloride brine having a calcium sulfate concentration suitable for use in the electrolysis of sodium chloride wherein rock salt containing calcium sulfate as an impurity is contacted with an aqueous sodium chloride solution the improvement which comprises contacting said rock salt with an aqueous sodium chloride solution initially containing from about 200 to about 300 g/l of sodium chloride and having a calcium ion concentration of 0.01 to 0.5 g/l and a sulfate ion concentration of 2 to 15 g/l for a contact time of at least thirty minutes and until sodium chloride brine having a calcium sulfate concentration suitable for use in said electrolysis is formed, the multiplication product of said calcium ion concentration and said sulfate ion concentration having a maximum value of 2, discontinuing said contact and removing undissolved calcium sulfate.

4,046,866

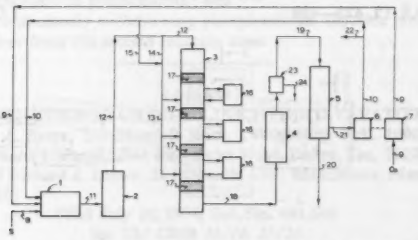
PRODUCTION OF LIQUID SULFUR TRIOXIDE

Harvey Zeh Hurlburt, Houston, Tex., and Clark A. Sumner, Santa Ana, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 24, 1975, Ser. No. 571,136

Int. Cl.² C01B *17/50, 17/76*

U.S. Cl. 423—533 **9 Claims**



1. In an oxygen-based process for the production of liquid sulfur trioxide at elevated pressure by combustion of sulfur with elemental oxygen, followed by catalytic conversion of the resulting sulfur dioxide to sulfur trioxide in at least two stages, recovering a portion of the sulfur trioxide by condensation of the gaseous product of the catalytic conversion and recycling of sulfur trioxide-containing gases to the combustion step, the improvement whereby sulfur trioxide is prepared without concomitant production of sulfuric acid or oleum comprising: conducting the combustion in a single stage, in the presence of from about 2 to about 6 moles of recycled gas per mole of sulfur at an outlet temperature of between about 1250° F. and 1800° F., condensing between about 20% and about 70% of the sulfur trioxide in the gaseous product of the catalytic conversion and recycling substantially all the uncondensed gases exiting from the sulfur trioxide condenser to the combustion step.

4,046,867

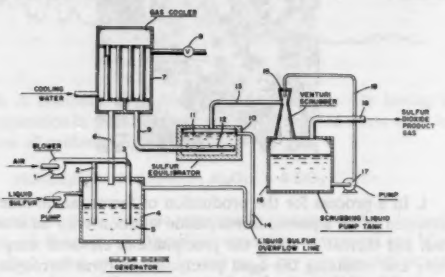
METHOD FOR MAKING SULFUR DIOXIDE-CONTAINING GAS STREAM

Philip F. Seeling, North Syracuse, and Samuel L. Bean, Jamesville, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Feb. 25, 1975, Ser. No. 552,822

Int. Cl.² C01B *17/54, 17/48;* B01D *47/02*

U.S. Cl. 423—543 **4 Claims**



1. In the method for generating a sulfur dioxide-containing gas stream of low elemental sulfur content involving the steps of contacting a stream of oxygen-containing gas with elemental sulfur maintained at temperature of at least about 500° F. to generate a gas stream comprising sulfur dioxide and gaseous elemental sulfur, followed by contacting said gas stream with elemental sulfur maintained at temperature of from about 240° F. to 310° F. to obtain a gas stream low in oxygen and elemental sulfur, the improvement which comprises:

contacting said gas stream low in oxygen and elemental sulfur in a venturi scrubber with water or an aqueous medium containing about 0.1 to about 10% by weight of ammonium ion under conditions of turbulent flow and recovering a sulfur dioxide-containing gas stream substantially free of oxygen and sulfur trioxide and containing less than about 0.0002 lb. of elemental sulfur per cubic foot of gas, measured at standard conditions.

4,046,868

PRODUCTION OF HYDROGEN PEROXIDE

Lawrence G. Vaughan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 26, 1973, Ser. No. 401,070

Int. Cl.² C01B *15/02*

U.S. Cl. 423—588 **10 Claims**

1. In a process for the production of hydrogen peroxide by the reduction and oxidation of an anthraquinone, the improvement which comprises carrying out the reduction and oxidation while the anthraquinone is dissolved in an (N,N-dialkyl)-carboxylic acid amide having a solubility in water of less than 1 percent at 25° C.

4,046,869

STEAM REFORMING PROCESS

Tansukhlal G. Dorawala, Wappingers Falls, and Russell R. Reinhard, Hopewell Junction, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 11, 1976, Ser. No. 657,139
Int. Cl.[2] C01B *1/18, 2/16*
U.S. Cl. 423—652 17 Claims

1. The method of steam reforming a charge hydrocarbon which comprises

passing mixture of steam and charge hydrocarbon into contact with a steam reforming catalyst containing oxide of nickel and oxide of chromium at steam reforming reaction conditions including temperature of 800°–1100° F and pressure of 0–100 psig for 30–180 seconds during which time the activity of the steam reforming catalyst, as measured by the mole percent conversion of charge hydrocarbon to product hydrogen, decreases during the reaction period;

interrupting said reaction period when the activity of said catalyst has decreased, said interrupting being effected by decreasing the flow of said charge hydrocarbon;

contacting said catalyst of decreased activity with steam during a regeneration period at regenerating conditions, including temperature of 800°–1100° F and pressure of 0–100 psig for 90–540 seconds, as the activity of said catalyst increases, thereby forming regenerated catalyst; and

recovering product hydrogen.

4,046,870

ASSAY FOR FREE THYROID HORMONES

William Hertl, Corning, and Gerald Odstrchel, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed June 30, 1976, Ser. No. 701,192
Int. Cl.[2] G01N *33/00, 33/16*
U.S. Cl. 424—1 7 Claims

1. A method for determining the concentration of free thyroid hormone in a fluid sample, the method comprising the steps of

1. performing separate immunoassays for thyroid hormone, one immunoassay being in the presence of a blocking agent and the other immunoassay being in the absence of a blocking agent to thereby establish a binding differential; and
2. then correlating that differential with a standard curve which relates known free thyroid hormone concentrations with binding differentials.

4,046,871

COMPOSITIONS AND SEROLOGICAL METHODS INCLUDING BOVINE SERUM ALBUMIN POLYMERS

Rudolph P. Reckel, Somerville, N.J., assignor to Ortho Diagnostics Inc., Raritan, N.J.

Filed Apr. 8, 1975, Ser. No. 566,641
Int. Cl.[2] C07G *7/00;* G01N *31/00, 33/16*
U.S. Cl. 424—11 10 Claims

1. A bovine serum albumin composition suitable for use in specific antibody detection and for antibody sensitized erythrocyte detection comprising at least one polymer of bovine serum albumin in an aqueous solution, said polymer or polymers being homopolymers in which from 2 to about 15 monomeric albumin units are joined to each other through a convalent peptide bond, said composition having a total albumin content of from about 10 percent to about 35 percent by weight of the composition; and

wherein the albumin component of said aqueous composition is prepared by a method comprising (i) intimately contacting bovine serum albumin with a peptide bond forming reagent selected from the group consisting of 3-H-isoxazolium salts and carbodiimide reagents to form albumin polymers, (ii) adding basic nitrogen compound to the polymerization mixture containing said polymers to quench the reaction and to substantially destroy excess peptide bond forming reagent, (iii) acidifying the mixture to a pH of about 4.5 to 7, and (iv) thereafter recovering the albumin monomers and polymers.

9. A method for detecting anti-D antibody sensitized erythrocytes comprising

1. intimately admixing with the anti-D antibody containing red cell suspension, a serological albumin composition comprising the composition of claim 3 and
2. centrifuging the resulting mixture and observing for agglutination.

4,046,872

DENTAL CREAM

Robert Lee Mitchell, Somerset, and William John Chung, Spotswood, both of N.J., assignors to Colgate Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 464,896, April 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 369,705, June 13, 1973, abandoned. This application Oct. 2, 1975, Ser. No. 618,856
Int. Cl.[2] A61K *7/18*
U.S. Cl. 424—52 22 Claims

1. A process of preparing a dental cream composition containing a monofluorophosphate salt which dental cream retains soluble monofluorophosphate as fluoride which dental cream comprises a dental cream vehicle, a water soluble monofluorophosphate salt, abrasives and alkali metal tripolyphosphate comprising dissolving in said dental cream vehicle containing said monofluorophosphate salt and said abrasives an alkali metal tripolyphosphate whereby there is dispersed or dissolved in said vehicle said alkali metal tripolyphosphate salt as a component which increases retention of soluble monofluorophosphate as fluoride, said monofluorophosphate salt being selected from the group consisting of alkali metal, calcium, magnesium and aluminum monofluorophosphate and present in an amount which provides between about 0.01 and1% by weight of fluoride in said composition, said abrasives being in amount between about 35 and 60% by weight, said abrasive consisting essentially of calcium carbonate and alumina, said alumina being present in an amount of at least about 0.05% by weight up to an amount equal to or less than but not greater than said calcium carbonate, and said alkali metal tripolyphosphate being in amount between about 0.1 and 1.5% by weight.

4,046,873

ALICYCLIC AMIDO-QUATERNARY AMMONIUM ANTI-BACTERIAL AGENTS

Robert Andrew Bauman, New Brunswick, N.J., assignor to Colgate Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 400,097, Sept. 24, 1973, Pat. No. 3,928,411, which is a continuation of Ser. No. 39,536, May 21, 1970, abandoned. This application Feb. 25, 1974, Ser. No. 445,713
Int. Cl.[2] A61K *7/22, 31/14;* C07C *87/40*
U.S. Cl. 424—54 8 Claims

1. A chemical compound having the structural formula:

wherein R is an alicyclic group seclected from the group consisting of an adamantyl group, a bicyclooctane group and a norborane group, R^2 and R^3 are independently a methyl or ethyl group, R^4 is an alkyl chain consisting of 10–18 carbon atoms, *n* is the integer 2 or 3 and X is an anion selected from the group consisting of halides, sulfates, nitrates and arylsulfonates.

7. A composition comprising an effective antimicrobial

amount of the compound of claim 1 admixed with a pharmaceutical carrier.

8. A composition comprising an effective antimicrobial amount of the compound of claim 1 admixed with an oral preparation.

4,046,874

SOAPLESS SHAVE COMPOSITION

John Lester Gabby; Dennis Dale Corbin, and Jack Bruner Lowe, all of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 442,015, Feb. 13, 1974, Pat. No. 3,936,391, which is a division of Ser. No. 153,837, June 16, 1971, Pat. No. 3,809,764, which is a continuation-in-part of Ser. No. 74,211, Sept. 21, 1970, abandoned. This application Nov. 17, 1975, Ser. No. 632,427

Int. Cl.[2] A61K 7/15

U.S. Cl. 424—73 2 Claims

1. A shaving cream adapted for dry shaving with a conventional razor blade which comprises an aqueous foam containing in the aqueous pahse from 0.5 to 7.5% by weight of a polyglycerol ester molecularly constituted of from 3 to 10 glycerol units and from 1 to 2 fatty acyl ester groups each containing from 16 to 20 carbon atoms and a texturizing amount of from 2 to 10% by weight of a water insoluble pulverulent bodying agent, wherein said composition contains substantially no soap, fat, or oil.

4,046,875

ATTENUATED TGE VIRUS

Slobodan M. Djurickovic, Middletown, Md., assignor to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 595,621, July 14, 1975, abandoned. This application Dec. 17, 1976, Ser. No. 751,902

Int. Cl.[2] A61K 39/12; C12K 9/00

U.S. Cl. 424—89 12 Claims

1. An attentuated live transmissible gastroenteritis (TGE) virus vaccine for swine comprising an attentuated live transmissable gastroenteritis virus and a pharmaceutically acceptable carrier, wherein the TGE virus has been attenuated by passaging virulent TGE virus on pig colon organ culture for at least five serial passages; said vaccine being suitable for oral administration to sows and said vaccine being further characterized by leaving the villi of the small intestines of piglets, to which the vaccine has been administered, undamaged and adsorption of protein by said villi is not prevented.

4,046,876

N^2-ALKOXYNAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, Kobe; Ryoji Kikumoto; Kazuo Ohkubo, both of Tokyo; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo; Yoshikuni Tamao, Yokohama, and Akiko Hijikata, Kobe, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

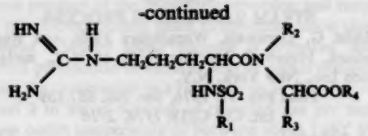
Continuation-in-part of Ser. No. 671,436, March 29, 1976, which is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Feb. 10, 1976, Ser. No. 656,870

The portion of the term of this patent subsequent to Apr. 19, 1994, has been disclaimed.

Int. Cl.[2] C07C 103/52; A61K 37/00

U.S. Cl. 424—177 8 Claims

1. N^2-alkoxynaphthalenesulfonyl-L-argininamides having the formula (I):



(I)

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and the pharmaceutically acceptable salts thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is selected from the group consisting of C_2–C_{10} alkyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkylthioalkyl, C_7–C_{15} aralkyl, C_3–C_{10} cycloalkyl and C_4–C_{10} cycloalkylalkyl; R_3 is C_1–C_5 alkyl; and R_4 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_7–C_{12} aralkyl and C_6–C_{10} aryl.

4,046,877

METHOD OF INCREASING IMMUNOLOGIC COMPETENCE

Abraham White, Palo Alto, and Pamela M. Burton, Cupertino, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 597,116, July 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 561,409, March 24, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,200

Int. Cl.[2] A61K 37/00

U.S. Cl. 424—177 3 Claims

1. A pharmaceutical composition useful for increasing immunologic competence comprising a therapeutically effective amount of human serum prealbumin in admixture with a pharmaceutically acceptable non-toxic carrier.

4,046,878

DAUNOMYCIN ANALOGUES, THEIR PREPARATION AND USE

Bianca Patelli; Luigi Bernardi, both of Milan; Federico Arcamone, Nerviano (Milan), and Aurelio Di Marco, Milan, all of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

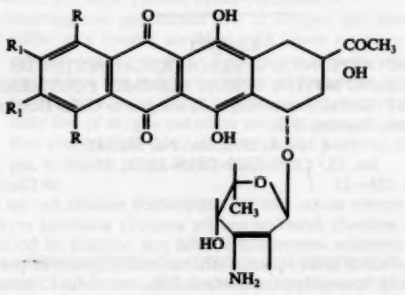
Filed May 22, 1975, Ser. No. 579,901

Claims priority, application United Kingdom, June 12, 1974, 26083/74

Int. Cl.[2] A61K 31/71; C07H 11/00

U.S. Cl. 424—180 20 Claims

1. A racemic daunomycin analogue of the formula



(I)

comprising the α-anomer, the β-anomer or a mixture of α- and β-anomers wherein when each R_1 is hydrogen, each R is hydrogen, chlorine, bromine methyl or methoxy; and when each R_1 is chlorine, bromine or methyl, each R is hydrogen.

18. A method of inhibiting the growth of a tumor selected from the group consisting of Moloney Sarcoma Virus, Sarcoma 180 Ascites and L_{1210} leukemia which comprises administering to a host afflicted with said tumor an amount of a compound according to claim 1 sufficient to inhibit the growth of

said tumor, together with an inert pharmaceutically acceptable carrier.

4,046,879

ANTIVIRAL COMPOSITIONS

Peter Swetly, Vienna, Austria, assignor to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Filed Mar. 1, 1976, Ser. No. 662,374
Claims priority, application Germany, Mar. 5, 1975, 2509531
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 4 Claims

1. A topical antiviral pharmaceutical composition consisting essentially of an inert carrier and uniformly distributed therein 0.05 to 20 mgm of at least one nucleoside triphosphate or deoxynucleoside triphosphate and 0.5 to 100 mgm of at least one complex-former for bivalent cations per gram of total weight of said composition.

4,046,880

METHOD OF TREATING HYPERTENSION

John L. Gainer, Charlottesville, Va., assignor to The University of Virginia, Charlottesville, Va.

Filed Apr. 20, 1976, Ser. No. 678,551
Int. Cl.² A61K *31/70, 31/20*
U.S. Cl. 424—180 6 Claims

1. A method for the treatment of hypertension in mammals which comprises administering to said mammal suffering from hypertension an antihypertensively effective dose of a water soluble carotenoid.

4,046,881

FUNGICIDALLY ACTIVE ANTIBIOTIC FROM STREPTOMYCES TENDAE ETTLINGER ET AL. TU 901

Ursula Dahn, Filderstadt-Bernhausen; Hanspaul Hagenmaier, Tuebingen; Helmut Hohne, Bad Soden; Wilfried Konig, Pinneberg; Hans Scheinpflug, Leverkusen, and Hans Zahner, Tuebingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 24, 1976, Ser. No. 669,780
Claims priority, application Germany, Aug. 20, 1975, 2537028
Int. Cl.² A61K *31/71;* C07H *19/06*
U.S. Cl. 424—181 3 Claims

1. The antibiotic Nikkomycin, which

a. is colorless, readily soluble in water and pyridine but insoluble in other customary organic solvents, shows a positive reaction with ninhydrin, sodium metaperiodate/-benzidine and potassium permanganate, and gives a yellow coloration with iron-(III) chloride;

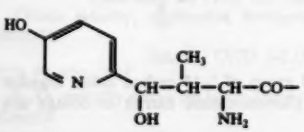
b. has the UV spectra and IR spectrum shown in FIGS. 1 and 2;

c. on chemical degradation gives uracil, an amino-hexuronic acid and an amino acid containing a pyridine ring;

d. proves, in paper electrophoresis, to be an amphoteric substance and has an isoelectric point at about pH 6;

e. comprises carbon, hydrogen, oxygen and nitrogen, and

f. has the formula



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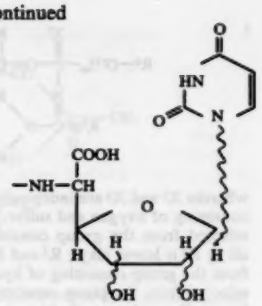


3. A process for combating fungi, comprising applying to such fungi or a fungus habitat a fungicidally effective amount of Nikkomycin according to claim 1.

4,046,882

ISOLATION OF UTERO-EVACUANT SUBSTANCES FROM PLANT EXTRACTS

Ramesh Maganlal Kanojia, Somerville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Nov. 18, 1976, Ser. No. 742,950
Int. Cl.² A61K *35/78*
U.S. Cl. 424—195 16 Claims

1. The method of purifying extracts containing uteroevacuant materials obtained from the zoapatle plant which comprises the steps of:

reacting semi-purified material obtained from the extract with an acylating agent, chromatographing the reaction mixture on an adsorbent material, eluting the adsorbent material and collecting the fractions containing acylated utero-evacuant materials.

4,046,883

FUNGICIDAL COMPOSITIONS BASED ON POLYIMIDES OF PHOSPHORUS AND METHOD OF TREATING PLANTS THEREWITH

Guy Lacroix, Lyon, and Jean-Claude Debourge, Courbevoie, both of France, assignors to Philagro S.A., France

Filed Oct. 7, 1975, Ser. No. 620,377
Claims priority, application France, Oct. 8, 1974, 74.34530
Int. Cl.² A01N *9/36*
U.S. Cl. 424—209 2 Claims

1. A method of treating plants to control fungal diseases thereof comprising applying to said plants a fungicidally effect amount of at least one compound of the formula

$$(RN)_6P_4$$

in which R is an alkyl radical containing 1 to 4 carbon atoms.

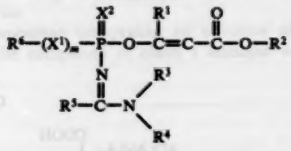
4,046,884

N-(α-AMINOALKYLIDENE)PHOSPHOR- AND PHOSPHONAMIDATES, AND METHOD FOR CONTROLLING INSECTS

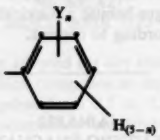
Leonard J. Stach, Riverside, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Mar. 1, 1976, Ser. No. 662,667
Int. Cl.² A01N *9/36;* C07F *9/24*
U.S. Cl. 424—210 10 Claims

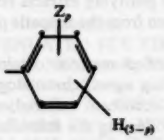
1. A compound of the formula



wherein X^1 and X^2 are independently selected from the group consisting of oxygen and sulfur; m is the integer 0 or 1; R^1 is selected from the group consisting of hydrogen and lower alkyl; R^2 is lower alkyl; R^3 and R^4 are independently selected from the group consisting of hydrogen and lower alkyl; R^5 is selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, lower alkylthio, amino and



wherein Y is selected from the group consisting of lower alkyl, halogen, lower alkoxy, lower alkylthio, nitro and cyano; and n is an integer from 0 to 3; and R^6 is selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxyalkyl and



wherein Z is selected from the group consisting of lower-alkyl, halogen, lower alkoxy, lower alkylthio, nitro and cyano; and p is an integer from 0 to 3.

2. A method of controlling insects which comprises contacting said insects with an insecticidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to insects, a compound of claim 1.

4,046,885

METHOXY-SUBSTITUTED CYANOPHENYL ESTER DERIVATIVES OF PHOSPHORUS ACIDS AS INSECTICIDAL AGENTS

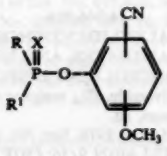
Edward N. Walsh, New City, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 632,523, April 21, 1967, Pat. No. 3,983,188, which is a continuation-in-part of Ser. No. 328,463, Dec. 6, 1963, abandoned. This application May 20, 1976, Ser. No. 688,506

Int. Cl.² A01N *9/36*

U.S. Cl. 424—210 **7 Claims**

1. A method for killing insects which comprises contacting the insects with an insecticidal amount of at least one compound represented by the formula:



where R and R^1 are members independently selected from the group consisting of lower alkyl, chloro-substituted lower alkyl, lower alkoxy, phenyl, and phenoxy; and X is a member selected from the group consisting of oxygen and sulfur.

4,046,886

DERMATOLOGICAL COMPOSITIONS

Donald Edward Smith, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 541,902, Jan. 17, 1975, Pat. No. 3,952,099, which is a division of Ser. No. 340,787, July 22, 1975, Pat. No. 3,896,238, which is a continuation-in-part of Ser. No. 241,404, April 5, 1972, abandoned. This application Jan. 12, 1976, Ser. No. 647,943

Int. Cl.² A61K *47/00, 7/48, 31/65*

U.S. Cl. 424—227 **5 Claims**

1. A composition adapted to topical application to animal tissue comprising: (1) a safe and effective amount of a pharmacologically active agent; (2) at least about 0.1% by weight of a sugar ester wherein said sugar ester is a member selected from the group consisting of sucrose monooctanoate, sucrose monodecanoate, sucrose monolaurate, sucrose monomyristate, sucrose monopalmitate, sucrose monostearate, sucrose monooleate, and sucrose dioleate; and (3) at least about 0.1% by weight of a phosphine oxide wherein said phosphine oxide is a member selected from the group consisting of octyl dimethyl phosphine oxide, nonyl dimethyl phosphine oxide, decyl dimethyl phosphine oxide, undecyl dimethyl phosphine oxide, dodecyl dimethyl phosphine oxide, 2-hydroxydecyl dimethyl phosphine oxide, 2-hydroxyundecyl dimethyl phosphine oxide and 2-hydroxydodecyl dimethyl phosphine oxide.

4,046,887

GLYCERIDES WITH ANTI-INFLAMMATORY PROPERTIES

Gerard Yvon Paris, Duvernay, and Denis Gaston Cimon, Montreal, both of Canada, assignors to Abbott Laboratories, North Chicago, Ill.

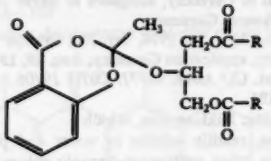
Filed Oct. 28, 1976, Ser. No. 736,633

Int. Cl.² C07D *319/08*

U.S. Cl. 424—232 **12 Claims**

1. A compound of the formula

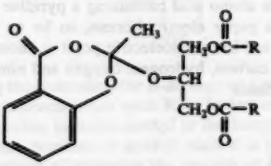
I



wherein each R is an alkyl group of 1–15 carbon atoms.

11. An anti-inflammatory composition containing an effective amount to combat inflammation in warm-blooded animals afflicted therewith, of the compound of formula

I



wherein R is an alkyl group of 1–15 carbon atoms together with and acceptable pharmaceutical carrier in dosage unit form.

4,046,888

METHODS FOR CATALYTIC REDUCTION OF NITROGEN OXIDES

Tsugio Maeshima; Eiichiroh Nishikawa, and Mitsuko Nakamura, all of Ohi, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1976, Ser. No. 665,946
Claims priority, application Japan, June 12, 1975, 50-71229
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—239 11 Claims

1. A process for reducing the concentration of nitrogen oxides in a gaseous mixture which comprises

A. introducing ammonia in an amount between about 1.2 and 3.0 times the stoichiometric amount necessary for reducing the nitrogen oxides into a reaction zone containing a catalyst said catalyst comprising an active metal component and natural or synthetic zeolite having an SiO_2/Al_2O_3 molar ratio of at least about 2 and an alkali metal content within the range from 0.2 to 0.6 equivalents per gram atom of alumina, the introduction of ammonia at this rate continuing for at least about 20 minutes and then

B. contacting the nitrogen oxides containing gas with the catalyst in the presence of ammonia in an amount between about 0.7 and 1.0 times the stoichiometric amount necessary for reducing the nitrogen oxides.

C. repeating step (A) periodically.

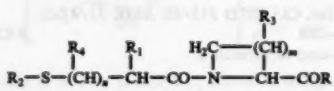
4,046,889

AZETIDINE-2-CARBOXYLIC ACID DERIVATIVES

Miguel Angel Ondetti, Princeton, and David W. Cushman, West Windsor, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 13, 1976, Ser. No. 657,792
Int. Cl.[2] C07D *205/08;* A61K *31/395*
U.S. Cl. 424—244 23 Claims

1. A compound of the formula



wherein

R is hydroxy, amino or lower alkoxy;

R_1 and R_4 each is hydrogen, lower alkyl or phenyl-lower alkyl;

R_2 is hydrogen or R_5—CO;

R_3 is hydrogen, hydroxy or lower alkyl;

R_5 is lower alkyl, phenyl or phenyl-lower alkyl;

m is 1;

n is 0, 1 or 2.

and basic salts thereof.

15. A method for reducing blood pressure by inhibiting the conversion of angiotensin I to angiotensin II which comprises administering a composition comprising a compound of claim 1 in an amount sufficient to reduce blood pressure by inhibiting the conversion of angiotension I to angiotension II and a pharmaceutically acceptable vehicle therefor.

4,046,890

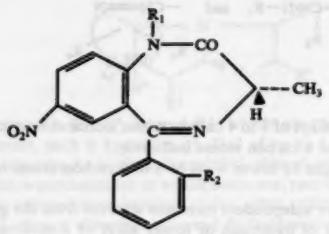
BENZODIAZEPINE DERIVATIVES

Andre Szente, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 23, 1975, Ser. No. 589,495
Claims priority, application Switzerland, June 28, 1974, 8926/74
Int. Cl.[2] C07D *243/24*
U.S. Cl. 424—244 6 Claims

1. An optically active 1,4-benzodiazepin-2-one of the general formula

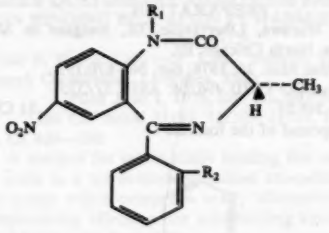
I



wherein R_1 represents a hydrogen atom or a lower alkyl group and R_2 represents a halogen atom, which have the absolute configuration S at the carbon atom in the 3-position.

5. An anthelmintic composition which comprises an anthelmintically active amount of a compound of the formula

I



wherein R_1 represents a hydrogen atom or a lower alkyl group and R_2 represents a halogen atom, which has the absolute configuration S at the carbon atom in the 3-position and a nontoxic, inert, therapeutically compatible carrier.

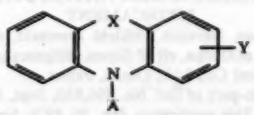
4,046,891

SMOOTH MUSCLE RELAXANT PROCESS EMPLOYING 10-IMIDOYLPHENOXAZINES

Yao Hua Wu, and Walter G. Lobeck, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 561,462, March 24, 1975, Pat. No. 3,962,252, which is a division of Ser. No. 336,671, Feb. 28, 1973, Pat. No. 3,888,852. This application Mar. 26, 1976, Ser. No. 670,600
Int. Cl.[2] A61K *31/535*
U.S. Cl. 424—248.4 13 Claims

1. The process for producing a smooth muscle relaxant effect in a mammal which comprises administering thereto a non-toxic dose of from about 0.01 to 10 mg./kg. of body weight of said mammal of a compound selected from the group consisting of 10-imidoylphenoxazines having the formula

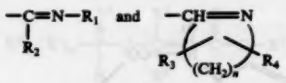


and a non-toxic pharmaceutically acceptable acid addition salt thereof wherein

X represents oxygen

Y represents hydrogen, trifluoromethyl, halogen, dihalogen, lower alkyl of 1 to 4 carbon atoms inclusive, lower alkoxy of 1to 4 carbon atoms inclusive; and

A is selected from the group consisting of



wherein

R_1 is lower alkyl of 1 to 4 carbon atoms inclusive or cycloalkyl of 3 to 6 carbon atoms inclusive;

R_2 is hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;

R_3 and R_4 are independent members selected from the group consisting of hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;

n is an integer of 3 to 5.

4,046,892

7-AZA-11,12-DIOXA-6-PHENYL-TRICYCLO[7,2,1,$0^{1,6}$]DODECANE DERIVATIVES AND PROCESS FOR THEIR PREPARATION

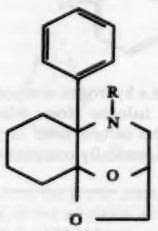
Edward John Warawa, Libertyville, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 24, 1976, Ser. No. 670,192

Int. Cl.² C07D *498/08;* A61K *31/535*

U.S. Cl. 424—248.57 **11 Claims**

1. The compound of the formula



wherein R is hydrogen or loweralkyl or a physiologically acceptable acid addition salt thereof.

4. An injectable anesthetic composition containing between 0.1 and 10% by weight of the compound of claim **1** in a liquid, physiologically acceptable diluent.

7. The process of preparing 7-aza-11,12-dioxa-6-phenyl-7-alkyl-tricyclo[7,2,1,$0^{1,6}$]dodecane comprising heating a 2-alkylamino-2-phenylcyclohexanone with a 2–10% molecular excess of epibromohydrin in the presence of an inert acceptor for HBr and an inert reaction medium, for 5 to 30 hours to a temperature between 80° C and 150° C.

4,046,893

TRIOXOPTERIDINE DERIVATIVES SUITABLE AS MEDICAMENT

Masuichi Takino, Narashi; Teikichi Kurosaki, and Munehiko Odaka, both of Osaka, all of Japan, assignors to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 396,810, Sept. 13, 1973, Pat. No. 3,946,012. This application Jan. 20, 1976, Ser. No. 650,749

Claims priority, application Japan, Sept. 13, 1972, 47-91907

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **3 Claims**

1. An analgesic and antiphlogistic pharmaceutical composition comprising an effective analgesic and antiphlogistic amount of the compound 6-dihydroxyethyl-2,4,7-trioxo-8-D-ribitylpteridine and a pharmaceutically acceptable, inert diluent, carrier or adjuvant.

4,046,894

CERTAIN BARBITURIC ACID DERIVATIVES USED AS ANTICONVULSANT AGENTS

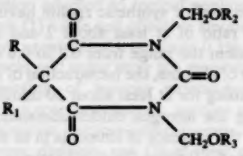
Carlos M. Samour, Wellesley, Mass., and Julius A. Vida, Greenwich, Conn., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 888,943, Dec. 29, 1969, which is a continuation-in-part of Ser. No. 749,972, Aug. 5, 1968, abandoned. This application Mar. 18, 1971, Ser. No. 125,813

Int. Cl.² A61K *31/515*

U.S. Cl. 424—254 **5 Claims**

1. A method of treating convulsions in warm-blooded animals which comprises administering to said animals an amount sufficient to produce an anticonvulsant effect of a compound having the structure



wherein R and R_1 are phenyl and ethyl respectively, or R and R_1 are individually ethyl, allyl or 2-pentyl and wherein R_2 and R_3 are individually methyl, ethyl, butyl, lauryl or benzyl.

4,046,895

PHENANTHRIDINE DERIVATIVES AND RELATED COMPOUNDS

Adrian Charles Ward Curran, South Cave, and Robin Gerald Shepherd, Burnham, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

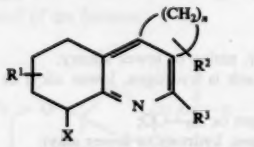
Filed Jan. 23, 1976, Ser. No. 651,748

Claims priority, application United Kingdom, Feb. 5, 1975, 4967/75

Int. Cl.² C07D *215/48;* A61K *31/47*

U.S. Cl. 424—258 **5 Claims**

1. A compound of formula I



(I)

wherein R^1 and R^2 are the same or different and represent hydrogen or alkyl of 1–6 carbon atoms, R^3 represents hydrogen, alkyl of 1–6 carbon atoms, or phenyl, X is $CSNHR^4$ wherein R^4 is hydrogen or alkyl of 1–6 carbon atoms and *n* is 3, 4 or 5 or a pharmaceutically acceptable acid addition salt of a compound where X is $CSNHR^4$.

4. An antiulcer composition comprising an effective amount of a compound of formula I as claimed in claim **1**, wherein X is $CSNHR^4$ and a pharmaceutically acceptable carrier.

4,046,896

1-METHYL-2-(PYRIDYL-OXYMETHYL)-5-NITRO-IMIDAZOLES

Erhardt Winkelmann, Kelkheim, Taunus, and Wolfgang Raether, Dreieichenhain, both of Germany, assignors to Hoechst Aktiengesellschaft, Franfurt am Main, Germany

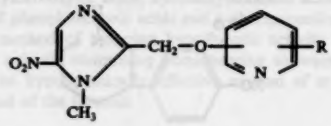
Filed May 14, 1976, Ser. No. 686,540

Claims priority, application Germany, May 17, 1975, 2522176

Int. Cl.² A61K *31/44;* C07D *233/22*

U.S. Cl. 424—263 **3 Claims**

1. A 1-methyl-2-(pyridyl-oxymethyl)-5-nitro-imidazle of the formula



wherein R is nitro or cyano and wherein oxygen is bound to pyridyl in the 2-, 3-, or 4-position.

3. A method for the treatment of disease caused by atrichomonad or amoeba in a human or animal suffering therefrom, which method comprises orally or locally administering to said human or animal a therapeutically effective amount of a compound as in claim 1.

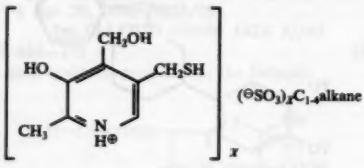
4,046,897

5-MERCAPTOPYRIDOXINE ALKANESULFONATES AND METHODS OF USE AND PHARMACEUTICAL COMPOSITIONS

Conrad P. Dorn, Plainfield; Howard Jones, Holmdel, and David P. Jacobus, Princeton, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

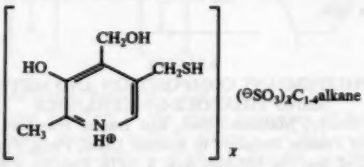
Continuation-in-part of Ser. No. 576,055, May 9, 1975, abandoned. This application Mar. 15, 1976, Ser. No. 666,536
Int. Cl.[2] A61K *31/44*; C07D *213/62*
U.S. Cl. 424—263 6 Claims

1. A compound of formula:



wherein X is 1 or 2, and C_{1-4} alkane is straight or branched chain.

3. A method of treating rheumatoid arthritis which comprises the administration to a patient in need of such treatment an effective amount of a compound of formula:



wherein X is 1 or 2, and C_{1-4} alkane is straight or branched chain.

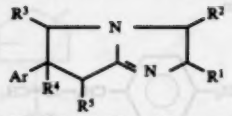
4,046,898

6-ARYL-PYRROLO[1,2-A]IMIDAZOLE DERIVATIVES WHICH POSSESS ANTI-HYPERTENSIVE ACTIVITY

Andrew Shaw, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jan. 26, 1976, Ser. No. 652,060
Claims priority, application United Kingdom, Jan. 31, 1975, 4303/75
Int. Cl.[2] A61K *31/44*, *31/415*; C07D *487/04*
U.S. Cl. 424—263 9 Claims

1. A compound selected from the group consisting of compounds of the formula:



wherein R^1, R^2, R^3, R^4 and R^5, which may be the same or different, each is hydrogen or alkyl of up to 4 carbon atoms, and wherein Ar is phenyl, naphthyl, thienyl, pyridyl or furyl which is unsubstituted or which bears one, two or three substituents selected from halogen, amino, nitro, trifluoromethyl and alkyl, alkoxy, alkanoylamino and dialkylamino each of up to 6 carbon atoms and the pharmaceutically-acceptable acid-addition salts thereof.

9. A method for lowering blood pressure in a warm-blooded animal which comprises administering to said animal an effective amount of a compound claimed in claim 1.

4,046,899

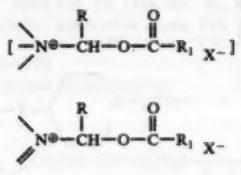
LABILE QUATERNARY AMMONIUM SALTS USEFUL IN BINDING BILE ACIDS IN WARM-BLOODED ANIMALS

Nicolae S. Bodor, Lawrence, Kans., assignor to INTERx Research Corporation, Lawrence, Kans.

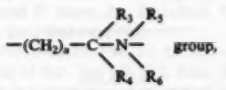
Filed June 1, 1976, Ser. No. 691,781
Int. Cl.[2] A61K *31/33*, *31/505*, *31/44*, *31/495*
U.S. Cl. 424—266 18 Claims

1. A method for substantially binding free and conjugated bile acids in a warm-blooded animal characterized as being ulcer-prone which comprises orally administering thereto, a therapeutically effective bile acid binding amount of a compound having the formula:

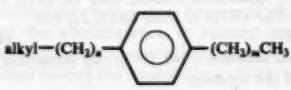
(I)



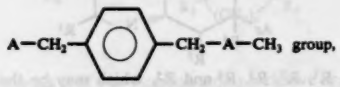
wherein ⩾N represents a pyridyl or nicotinic acid group; wherein R represents a member selected from the group consisting of a hydrogen atom, a C_1–C_{20} open chain or cyclo alkyl group, a C_1–C_{20} alkoxyalkyl group, a C_1–C_{20} alkanoyloxyalkyl group, a C_1–C_{20} haloalkyl group, a C_1–C_{20} carboxyalkyl group, a phenyl group, a naphthyl group, and a substituted phenyl or naphthyl group, whose substituents are selected from the group consisting of a halogen atom, an O–C_1–C_4 alkyl group, an O–C_1–C_8 alkanoyl group, a nitro group, a carboxyl group, and a carboethoxy group; wherein R_1, which may be the same or different, represents any member defined by R above with the proviso that R cannot be a hydrogen atom, a



wherein R_3, R_4, R_5 and R_6 are each selected from the group consisting of a hydrogen atom, a methyl group or an ethyl group, a C_1–C_{22} straight or branched



wherein *n* in each occurrence and *m* represent an integer of from 0 to 22, an



wherein A represents a C_1–C_{22} straight or branched alkyl group as above or a $-(CH_2CH_2O)_p$ group, wherein the *p* represents an integer of from 0 to 22, and the residue of any naturally occurring bile acid selected from the group consisting of cholic acid, deoxycholic acid, glycocholic acid and chenodeoxycholic acid; and wherein X represents a halogen atom, a methanesulfonate group, a fluorosulfonate group and a tosylate group.

4,046,900

BENZOYLPIPERIDYLALKYLINDOLES

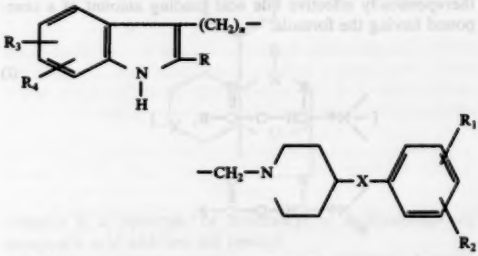
Grover C. Helsley, Pottersville; Joseph T. Strupczewski, Flemington, and Beth Ann Gardner, Stanhope, all of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 594,042, Aug. 8, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 663,820

Int. Cl.[2] C07D *401/06*

U.S. Cl. 424—267 **20 Claims**

1. A compound of the formula



wherein X is

or CHOH; R is hydrogen or methyl; R_1 and R_2 are the same or different and stand for hydrogen, halogen, straight or branched chain alkyl of up to 5 carbon atoms, alkoxy of up to 5 carbon atoms, trifluoromethyl, hydroxy, phenoxy or phenyl; R_3 and R_4 are hydrogen or methoxy; *n* is the integer 1 or 2; or an acid addition salt thereof prepared from a pharmaceutically acceptable acid.

4,046,901

PHENYLPIPERIDINES

Lucien Nedelec, Le Raincy; Jacques Guillaume, Aulnay-sous-Bois, and Claude Dumont, Nogent-sur-Marne, all of France, assignors to Roussel-UCLAF, Paris, France

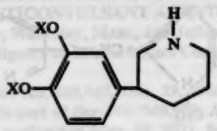
Filed May 13, 1976, Ser. No. 686,076

Claims priority, application France, May 16, 1975, 75.15381

Int. Cl.[2] C07D *211/22*; A61K *31/445*

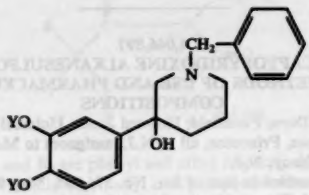
U.S. Cl. 424—267 **11 Claims**

1. A compound selected from the group consisting of phenylpiperidines of the formula

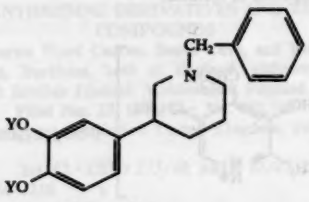


wherein X is selected from the group consisting of hydrogen and an acyl of alkanoic acid of 2 to 6 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

5. A compound selected from the group consisting of N-benzyl-3-(3',4'-dimethoxyphenyl)-piperidine, a compound of the formula



and a compound of the formula



wherein Y is selected from the group consisting of $-CH_3$ and benzyl and the dotted line is a double bond in the 2,3 or 3,4 position of piperidine.

11. A method of reducing hypertension in warm-blooded animals comprising administering to warm-blooded animals an hypotensively effective amount of 3-(3',4'-dihydroxyphenyl)-piperidine or its non-toxic, pharmaceutically acceptable acid addition salts.

4,046,902

HYPOLIPEMIANT COMPOSITION AND METHOD USING THIAZOLE-5-METHANOLS

Michel Hardy, Maisons-Alfort, and Daniel Humbert, Paris, both of France, assignors to Roussel Uclaf, Paris, France

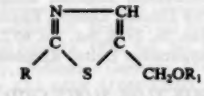
Division of Ser. No. 495,556, Aug. 8, 1974, Pat. No. 3,957,809. This application Feb. 26, 1976, Ser. No. 661,608

Claims priority, application France, Aug. 29, 1973, 73.31182

Int. Cl.[2] A61K *31/425*

U.S. Cl. 424—270 **5 Claims**

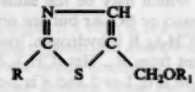
1. An hypolipemiant composition comprising an hypolipemiantly effective amount of at least one compound of the formula



wherein R is alkyl of 2 to 12 carbon atoms and R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 8 carbon atoms and acyl of an organic carboxylic acid of 1 to 12 carbon

atoms selected from the group consisting of alkanoic acids, cycloalkylcarboxylic acids, cycloalkylalkanoic acids, benzoic acid, and phenyl alkanoic acids and a pharmaceutical carrier.

2. A method of inducing hypolipemic activity in warm-blooded animals comprising administering to warm-blooded animals an hypolipemically effective amount of at least one compound of the formula



wherein R is alkyl of 2 to 12 carbon atoms and R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 8 carbon atoms and acyl of an organic carboxylic acid of 1 to 12 carbon atoms selected from the group consisting of alkanoic acids, cycloalkylcarboxylic acids, cycloalkylalkanoic acids, benzoic acid, and phenyl alkanoic acids.

4,046,903

ORGANOMETALLIC DERIVATIVES OF PENICILLIN

Eva Irene Edwards, 42 Woodfield Avenue, Brierley Hill, West Middlands; Roger Epton, 2 Claydon Road, Wall Heath, West Middlands, and George Marr, 67 Swelling Green Lane, Codsal, Wolverhampton, all of England

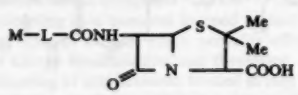
Filed Oct. 20, 1975, Ser. No. 624,405

Claims priority, application United Kingdom, Oct. 30, 1974, 46932/74; Apr. 29, 1975, 17853/75

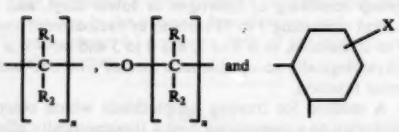
Int. Cl.[2] C07D *499/44;* A61K *31/43*

U.S. Cl. 424—271 **17 Claims**

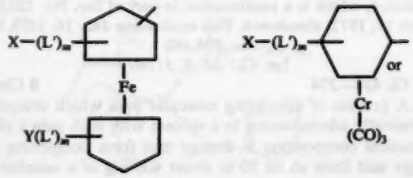
1. A semi-synthetic penicillin of the formula:



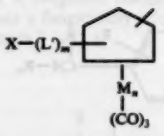
wherein: L is selected from the group consisting of



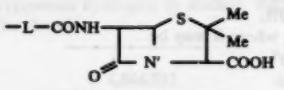
n being an integer from 0 to 2, and each R_1 and R_2 are the same or different members of the group consisting of hydrogen, alkyl, aryl, alkaryl, aralkyl, alkoxy, —CHO, —COOH, $-CH_2N(CH_3)_2$, $-NH_2$, $-C_6H_5$, $-CH_2SH$, $-CH_2I$, —CO—CH_2Z wherein Z is Cl, Br or I, $-MeR_3$ wherein Me is Si, Ge or Sn and R is alkyl containing 1 to 3 carbon atoms, or R_1 and R_2 taken together form a cycloalkyl group; and M is selected from the group consisting of pi-bonded aromatic organometallic complexes of a transition metal represented by the formulae:



-continued



X and Y being the same of different members of the group consisting of hydrogen, alkyl, aryl, aralkyl, alkaryl, —CHO, —COOH, $-CH_2N(CH_3)_2$, $-NH_2$, $-C_6H_5$, $-CH_2SH$, —CH I or —CO—CH_2Z wherein Z is Cl, Br or I, $-MeR_3$ wherein Me is defined as above, or another penicillin nucleus:



L′ represents a methylene linkage or —O—, and *m* is 0 or 1, or a pharmaceutically acceptable salt thereof.

4,046,904

NOVEL PENICILLIN, AND ITS PREPARATION AND USE

Hirotada Yamada, Nishinomiya; Hisao Tobiki, Kobe; Norihiko Tanno, Takarazuka; Kozo Shimago, Toyonaka; Kosaku Okamura, Minoo; Takenari Nakagome, Nishinomiya; Toshiaki Komatsu, Takarazuka; Akio Izawa, Kawanishi; Hiroshi Noguchi, Nishinomiya; Kenji Irie, Takarazuka, and Yasuko Eda, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

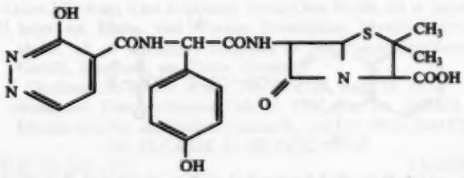
Filed Feb. 13, 1976, Ser. No. 658,035

Claims priority, application Japan, Feb. 14, 1975, 50-19040

Int. Cl.[2] A61K *31/43;* C07D *499/68*

U.S. Cl. 424—271 **3 Claims**

1. A compound of the formula:



or a non-toxic, pharmaceutically acceptable salt thereof.

4,046,905

ANTI-INFLAMMATORY, ANALGESIC AND ANTIPYRETIC PHENYLACETIC ACIDS

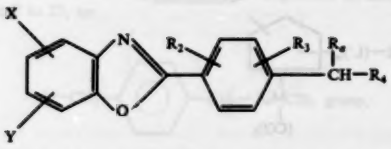
Tsung-Ying Shen, Westfield, N.J.; Jorge P. Li, Brown Deer, Wis., and Conrad P. Dorn, Jr., Plainfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 548,486, Feb. 10, 1975, Pat. No. 3,947,582, which is a division of Ser. No. 388,852, Aug. 16, 1973, Pat. No. 3,899,506, which is a continuation-in-part of Ser. No. 165,389, July 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 71,227, Sept. 10, 1970, abandoned. This application Aug. 14, 1975, Ser. No. 604,524

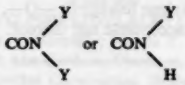
Int. Cl.[2] A61K *31/42*

U.S. Cl. 424—272 **10 Claims**

1. A method of treating pain, fever and inflammation which comprises the administration to humans and animals of an analgesic, antipyretic or anti-inflammatory effective amount of a compound having the formula:



or a pharmaceutically acceptable salt thereof, wherein
R_a is hydrogen or methyl;
R_2, R_3, X and Y are each hydrogen,
chloro,
bromo, or
fluoro; and
R_4 is COOH;
COOR, where R may be
C_{1-5} alkyl,
$CONH_2$;



where Y may be C_{1-3} alkyl.

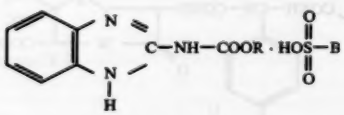
4,046,906

SALTS OF ALKYL 2-BENZIMIDAZOLE-CARBAMATE

Heinz Frensch, Frankfurt am Main; Konrad Albrecht, Fischbach, Taunus, and Kurt Hartel, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 462,124, April 18, 1974, abandoned. This application Oct. 1, 1975, Ser. No. 618,571
Claims priority, application Germany, Apr. 21, 1973, 2320529
Int. Cl.[2] A61K *31/415;* **C07D** *235/32*
U.S. Cl. 424—273 R **13 Claims**

1. A water insoluble compound of the formula



II

in which R is alkyl having 1–4 carbon atoms and B is alkyl, alkenyl, alkoxy each having from 10 to 20 carbon atoms, alkylphenyl, alkylnaphthyl, or alkoxy phenyl or mixtures thereof each having from 10 to 20 carbon atoms.

13. Process for combating fungus diseases in plants which comprises treating the plants with an effective amount of a compound as claimed in claim **1**.

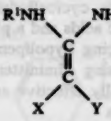
4,046,907

IMIDAZOLE ALKYLAMINOETHYLENE COMPOUNDS

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote; Charon Robin Ganellin, Welwyn Garden City, and Hunter Douglas Prain, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Continuation-in-part of Ser. No. 468,617, May 9, 1974, Pat. No. 3,953,460. This application Nov. 5, 1975, Ser. No. 629,174
Claims priority, application United Kingdom, May 17, 1973, 23568/73
Int. Cl.[2] A61K *31/415;* **C07D** *233/88*
U.S. Cl. 424—273 R **10 Claims**

1. A compound of the formula:



wherein X and Y, which may be the same or different, are hydrogen, nitro, cyano or SO_2Ar but are not both hydrogen; R^1 is Het-$(CH_2)_m$Z$(CH_2)_n$; R is hydrogen, lower alkyl or, being the same or different from R_1, Het-$(CH_2)_m$Z$(CH_2)_n$; Z is sulphur or methylene; m is 0, 1 or 2 and n is 2 or 3 provided that the sum of m and n is 3 or 4; Het is an imidazole ring which ring is attached at a ring carbon and which ring is optionally substituted by lower alkyl or halogen; and Ar is an aryl group such as phenyl optionally substituted by halogen or methyl or a pharmaceutically acceptable acid addition salt thereof.

10. A method of inhibiting H-2 histamine receptors which comprises administering to an animal in an effective amount to inhibit said receptors a compound of claim **1**.

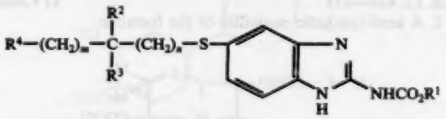
4,046,908

BENZIMIDAZOLE DERIVATIVES, COMPOSITIONS THEREOF AND METHOD OF USE AS ANTHELMINTICS

Rudiger D. Haugwitz, and Barbara V. Maurer, both of Titusville, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed July 16, 1976, Ser. No. 706,040
Int. Cl.[2] C07D *235/32, 401/12*
U.S. Cl. 424—273 R **10 Claims**

1. A compound of the structure



wherein R^1 is lower alkyl, phenyl-lower alkyl, halo-lower alkyl, mono lower alkylaminoalkyl, and alkyl pyridinium halide, R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen or lower alkyl, and R^4 is cycloalkyl containing 3 to 12 carbons or cycloalkenyl containing 3 to 10 carbons, m is 0 to 3, n is 0 to 3 and $m + n$ is $\leqq 5$, and physiologically acceptable salts thereof where R^1 includes an amino function.

10. A method for treating helminthiasis which comprises administering to a mammalian host a therapeutically effective amount of the composition as defined in claim **9**.

4,046,909

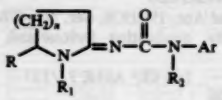
PYRROLIDYLIDENE, PIPERIDYLIDENE AND HEXAHYDROAZEPINYLIDENE UREAS AS CNS DEPRESSANTS

Chris Royce Rasmussen, Ambler; Joseph Francis Gardocki, Doylestown, and James Nelson Plampin, Roslyn, all of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Division of Ser. No. 499,706, Aug. 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 335,845, Feb. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 235,816, March 17, 1972, abandoned. This application July 16, 1975, Ser. No. 596,480
Int. Cl.[2] A61K *31/40*
U.S. Cl. 424—274 **8 Claims**

1. A process of alleviating muscular pain which comprises systemically administering to a subject with such pain a pharmaceutical composition in dosage unit form comprising per dosage unit from about 50 to about 400 mg of a member se-

lected from the group consisting of a compound of the formula:



wherein n is the integer 1, 2 or 3, R is a member selected from the group consisting of hydrogen and loweralkyl, R_1 is a member selected from the group consisting of loweralkyl and benzyl, R_2 is a member selected from the group consisting of hydrogen and loweralkyl, and Ar is a member selected from the group consisting of di-halophenyl, di-loweralkylphenyl, di-loweralkoxyphenyl, di-trifluoromethylphenyl, loweralkyl-halophenyl, loweralkoxy-halophenyl, benzyloxy-halophenyl, trifluoromethylhalophenyl and nitro-halophenyl, provided that when said n is 2 or 3, then said R is hydrogen and said R_1 is loweralkyl, and the therapeutically active acid addition salts thereof in admixture with a pharmaceutical carrier.

4,046,910

DOSAGE SCHEDULE

Herbert G. Johnson, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 436,996, Jan. 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 323,158, Jan. 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 278,275, Aug. 7, 1972, abandoned. This application Apr. 14, 1976, Ser. No. 677,514

Int. Cl.[2] A61K *31/35, 31/385*

U.S. Cl. 424—278 **8 Claims**

1. A method for administering DSCG in mammals for the prophylatic treatment of allergy of a reagin or non-reagin mediated nature which comprises

a. administrating to a mammal in need of said treatment a priming dose of DSCG which provides effective inhibition of allergy manifestation, and thereafter

b. administering to said mammal treated in step (a) an effective maintenance dose of DSCG, said maintenance dose quantity

1. providing greater inhibition of allergic manifestations in the maintenance dose situation than the same quantity provides in the priming dose situation and

2. being about 0.1 to about 20% of the quantity of the priming dose.

4,046,911

N-(SUBSTITUTED PHENYL)-N-FURANOYL-ALANINE METHYL ESTERS AND THEIR USE IN FUNGICIDAL COMPOSITION AND METHODS

Adolf Hubele, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 563,036, March 28, 1975, abandoned. This application July 6, 1976, Ser. No. 703,037

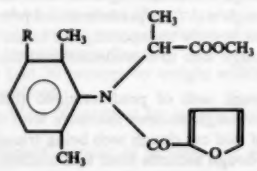
Claims priority, application Switzerland, Apr. 2, 1974, 4572/74; Feb. 10, 1975, 1591/75

Int. Cl.[2] A01N *9/20;* **C07D** *307/68*

U.S. Cl. 424—285 **9 Claims**

1. An anilide of the formula I

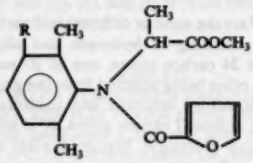
(I)



wherein R represents hydrogen or methyl.

5. A fungicidal composition which contains as active substance a fungicidally effective amount of a compound of the formula I

(I)



wherein R represents hydrogen or methyl, together with a suitable carrier therefor.

4,046,912

S-P-METHOXYPHENYL N-2,3-DIBROMOPROPYLTHIOLCARBAMATE AND ITS USE IN THE CONTROL OF PLANT NEMATODES

William E. Bissinger, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 13, 1975, Ser. No. 631,751

Int. Cl.[2] A01N *9/12;* **C07C** *155/02*

U.S. Cl. 424—300 **14 Claims**

1. S-p-methoxyphenyl N-2,3-dibromopropylthiolcarbamate.

2. A method of controlling the deleterious effects of plant pathogenic nematodes upon plants and plant parts which comprises:

applying an effective amount of S-p-methoxyphenyl N-2,3-dibromopropylthiolcarbamate to the area deleteriously effected by said nematodes to control said deleterious effects of the nematodes.

4,046,913

1-(M-ALKANOYLOXY-PHENYL)-1-HYDROXY-2-(N-LOWER ALKYL-AMINO)-ETHANES AND SALTS THEREOF

Anton Mentrup; Kurt Schromm; Ernst-Otto Renth, all of Ingelheim am Rhein, and Werner Traunecker, Munster-Sarmsheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 497,726, Aug. 15, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,401

Claims priority, application Germany, Aug. 18, 1973, 2341876

Int. Cl.[2] A61K *31/22;* **C07C** *67/08*

U.S. Cl. 424—311 **3 Claims**

1. 1-(m-Stearyloxy-phenyl)-1-hydroxy-2-(N-ethylamino)-ethane or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3. The method of treating cardiac and circulatory insufficiency in a warm-blooded animal in need thereof, which comprises administering to said animal an effective circulation and heart function enhancing amount of a compound of claim 1.

4,046,914

THERAPEUTICALLY ACTIVE SUBSTITUTED SATURATED AND MONO-AND POLYUNSATURATED ALKYL-GLYCERYLETHERS

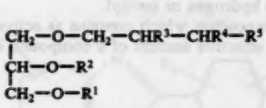
Bo Erik Hallgren, Molndal, and Gunnel Anna Maria Stallberg, Goteborg, both of Sweden, assignors to Astra Nutrition AB, Molndal, Sweden

Continuation of Ser. No. 152,976, June 14, 1971, abandoned, which is a division of Ser. No. 689,789, Dec. 12, 1967, abandoned. This application Feb. 27, 1975, Ser. No. 553,683

Int. Cl.[2] A61K *31/23, 31/22*

U.S. Cl. 424—312 **30 Claims**

1. A pharmaceutical preparation containing as an active ingredient at least one glycerol ether of the formula



wherein R^1 and R^2 are the same or different and each is selected from the group consisting of hydrogen and aliphatic acyl groups of at most 24 carbon atoms, one of R^3 and R^4 being hydrogen and the other being selected from the group consisting of straight, branched, saturated and unsaturated alkoxy groups containing at most 7 carbon atoms, R^5 is selected from the group consisting of straight, branched, alkyl and alkenyl groups of 4 to 21 carbon atoms, in association with a pharmaceutically acceptable carrier, said active ingredient being present in an amount of at least 5% by weight, effective to exhibit antibacterial or cytostatic activity.

4,046,915

PROCESS FOR TREATING ELEVATED PLATELET ADHESIVENESS

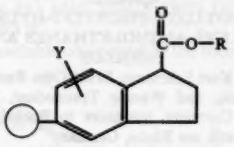
Neel C. Sekhar, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 530,255, Dec. 6, 1974, Pat. No. 3,996,103, which is a continuation of Ser. No. 371,033, June 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,698, July 31, 1972, abandoned. This application Aug. 26, 1976, Ser. No. 717,841

Int. Cl.² A61K *31/19*

U.S. Cl. 424—317 **4 Claims**

1. A process for treating elevated platelet adhesiveness comprising the administration of an effective amount for reducing platelet adhesiveness of a compound of the formula:



wherein ◯ is phenyl; Y is hydrogen, halogen, $—CF_3$, —OH, lower alkyl of 1 to 8 carbon atoms, lower alkoxy of 1 to 8 carbon atoms, $—NH_2$, —SH, or —S-lower alkyl of 1 to 8 carbon atoms; and R is hydrogen, or a pharmacologically acceptable cation, to a human or animal having elevated platelet adhesiveness.

4,046,916

N-(CARBOXYMETHOXY-BENZYLIDINE)CARBOXY ANILINES AND PHARMACEUTICAL COMPOSITIONS THEREOF

Georges Negrevergne, Bordeaux, France, assignor to Societe Anonyme Cortial S.A., Paris, France

Division of Ser. No. 327,236, Jan. 26, 1973, Pat. No. 3,947,587. This application Dec. 4, 1974, Ser. No. 529,464

Claims priority, application France, Jan. 27, 1972, 72.02644

Int. Cl.² C07C *101/66*

U.S. Cl. 424—319 **12 Claims**

1. The product 2-N-(4'-carboxymethoxy-benzylidene)-carboxy-aniline.

7. A pharmaceutical composition having analgesic and antipyretic activity which comprises as the active ingredient a therapeutically effective amount of the product of claim 1.

4,046,917

METHOD OF TREATING MIGRAINE

Günter Scholtysik, Reinach, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Apr. 19, 1976, Ser. No. 678,241

Claims priority, application Switzerland, Apr. 23, 1975, 5205/75

Int. Cl.² A61K *31/155*

U.S. Cl. 424—326 **4 Claims**

1. A method of treating or preventing migraine in animals which comprises administering a therapeutically effective amount of the compound 2,6-dichlorophenyl-acetylguanidine to an animal in need of such treatment.

4,046,918

TREATMENT OF CELLS

Gregorio Ramon Cebrian, Madrid, Spain, assignor to Fundacion de Estudios Farmaco-Biologicos, Madrid, Spain

Division of Ser. No. 366,360, June 4, 1973, Pat. No. 3,991,211, which is a division of Ser. No. 201,331, Nov. 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 155,239, June 21, 1971, abandoned. This application Jan. 24, 1975, Ser. No. 543,909

Claims priority, application Spain, June 19, 1970, 380951; United Kingdom, Dec. 30, 1970, 61899/70

Int. Cl.² A61K *31/12*

U.S. Cl. 424—331 **4 Claims**

1. A method for selective cell necrosis, which comprises administering through the circulatory system to the altered cells of a patient having such altered cells a pharmaceutically effective amount of a composition containing 1,2-diphenyl-α,β-diketone and a pharmaceutically suitable carrier therefor.

4,046,919

TREATMENT OF CELLS

Gregorio Ramon Cebrian, Madrid, Spain, assignor to Fundacion de Estudios Farmaco-Biologicos, Madrid, Spain

Division of Ser. No. 366,360, June 4, 1973, Pat. No. 3,991,211, which is a division of Ser. No. 201,331, Nov. 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 155,239, June 21, 1971, abandoned. This application Jan. 24, 1975, Ser. No. 543,910

Claims priority, application Spain, June 19, 1970, 380951; United Kingdom, Dec. 30, 1977, 61899/70

Int. Cl.² A61K *31/075*

U.S. Cl. 424—338 **5 Claims**

1. A method for selective cell necrosis, which comprises administering through the circulatory system to the altered cells of a patient having such altered cells a pharmaceutically effective amount of a composition containing benzoyl peroxide and a pharmaceutically suitable carrier therefor.

4,046,920

METHOD FOR FORMING DOUGH SHELLS

Roy V. Moline, Duluth, Minn., assignor to Jeno's, Inc., Duluth, Minn.

Division of Ser. No. 167,405, July 29, 1971, Pat. No. 3,880,069. This application Feb. 25, 1975, Ser. No. 552,842

Int. Cl.² A21D *8/02*

U.S. Cl. 426—19 **8 Claims**

1. A method for forming dough into dough sections comprising the steps of

sheeting said dough into a moving continuous dough web:

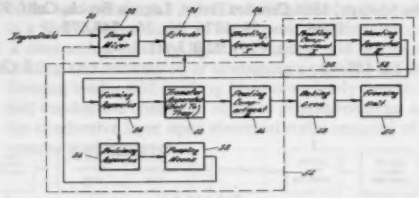
proofing said dough web for a predetermined proofing interval while concurrently transporting the same;

sheeting said dough web to a predetermined thickness and width;

cutting said dough web of predetermined thickness and width to form dough sections therefore with the remaining portion of said cut dough web being trimmings;

separating said dough sections from said trimmings;

blending said trimmings into said dough prior to the sheeting thereof; and



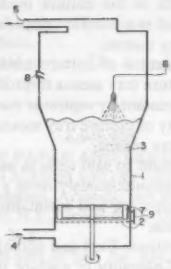
proofing said separated dough sections for a predetermined resting interval while concurrently transporting the same.

4,046,921

PROCESS FOR CULTIVATING MICROORGANISMS BY MEANS OF FLUIDIZED BED

Takeshi Akao; Toshio Sakasai, both of Noda; Yoshikazu Matsuyama, Nagareyama, and Yukio Kasuga, Takasago, all of Japan, assignors to Kikkoman Shoyu Co., Ltd., Noda, Japan

Filed Feb. 4, 1976, Ser. No. 655,130
Claims priority, application Japan, Feb. 5, 1975, 50-14290
Int. Cl.² A23L *1/20*
U.S. Cl. 426—46 **39 Claims**



19. A process for producing a soy sauce koji by means of fluidized bed comprising cultivating a microorganism on a solid culture medium while mixing the solid culture medium in a fluidized bed with an upward gas stream and supplying an atomized liquid into the solid culture.

4,046,922

SHELF STABLE, SEMI-MOIST SIMULATED EGG

Morris P. Burkwall, Jr., Marengo, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Continuation-in-part of Ser. No. 471,338, May 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 234,990, March 15, 1972, abandoned. This application May 17, 1976, Ser. No. 686,724
The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.
Int. Cl.² A23L *1/32*
U.S. Cl. 426—104 **8 Claims**

1. A shelf stable, semi-moist, simulated, cooked, egg product comprising:

a. from about 1 to about 35 percent by weight of egg solids;
b. from about 5 to about 35 percent by weight of a member selected from the group consisting of sugar, sugar equivalents, and mixtures thereof;
c. from 1 to 30 percent by weight edible water absorbing hydrocolloid:
d. from 10 to 30 percent by weight high protein binding agent;
e. a sufficient amount of at least one edible, food-grade, non-toxic acid or acid salt to adjust the pH to from 4.5 to 6.9;
f. sufficient antimycotic to prevent mold; and
g. sufficient water to give a final moisture content of from 20 to 40 percent by weight; and
h. wherein the total weight percentage of the product is 100 percent and (b), (e), and (f) provide bacteriological stability and shelf stability.

4,046,923

PACKAGE WITH STAGGERED PRODUCT SLICES AND PROCESS FOR PRODUCING THE SAME

John C. Meng, and Gerald J. Driessen, both of Green Bay, Wis., assignors to L. D. Schreiber Cheese Co., Inc., Green Bay, Wis.

Filed Oct. 19, 1970, Ser. No. 81,687
Int. Cl.² A23C *19/16*
U.S. Cl. 426—130 **10 Claims**

1. A package comprising: a plurality of quadrilateral product slices formed of a flexible, plastic material, such as cheese, each slice having substantially the same external dimensions, said slices being arranged in a stack with a major portion of adjacent slices in face abutting engagement with one another, the lateral edges of adjacent slices being parallel and offset relative to one another to provide a gripping portion that extends laterally outwardly relative to an adjacent slice, said gripping portions having a dimension that is sufficient to facilitate manual separation of the slices but insufficient to allow the gripping portions to sag out of the plane of the major portion of the slice, the lateral edges of the offset portions of alternating slices being aligned with one another to provide parallel surfaces at opposite sides of the stack that are perpendicular to the top and bottom thereof, and wrapping means enclosing said stack therewithin.

8. A process for producing a package having staggered product slices comprising: providing a plurality of product ribbons formed of a flexible, plastic material such as cheese, said ribbons having substantially the same lateral dimensions, offsetting adjacent ribbons laterally relative to one another while maintaining alternating ribbons in alignment with one another, guiding the ribbons into overlapping relationship to provide a stack of ribbons, wherein the lateral edges of adjacent ribbons are offset relative to one another, the dimension of said offset being sufficiently small to prevent the offset edges from sagging; said ribbon offsetting and guiding steps being performed by moving the ribbons of each group past guide members, and locating the guide members such that a guide member bears against at least one lateral edge of each ribbon; severing said stack of ribbons in longitudinally spaced locations to segregate the stack of ribbons into individual stacks of staggered product slices, and thereafter applying a wrapper to said stacks of product slices.

4,046,924

METHOD FOR PANCAKE COOKING

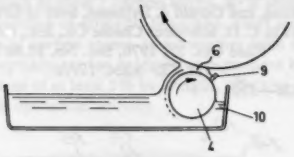
Pierre Tanguy, Dijon, France, assignor to Etud, Dijon, France

Division of Ser. No. 473,227, May 24, 1974, Pat. No. 3,978,781. This application Dec. 19, 1975, Ser. No. 642,301
Claims priority, application France, June 1, 1973, 73.20016
Int. Cl.² A21B *1/48*; A21D *8/06*
U.S. Cl. 426—502 **1 Claim**

1. A method for applying a cooking mix to the cylindrical cooking surface of the rotating cooking drum of an automatic machine for making pancakes, whereby a coating of the mix is

selectively applied to the cooking surface, comprising the steps of: providing a rotating drum;

entraining a film of mix by adhesion on the surface of a continuously rotating mix-entraining roller partly immersed to a substantially constant depth in a tank containing the mix, said roller rotating oppositely from the direction of rotation of said drum and being located generally below said drum in confronting relationship, the mutually opposite surfaces of said roller and said drum being spaced apart a distance greater than the thickness of the layer of mix entrained by adhesion on said roller;



tangentially contacting the surface of said roller with a retaining member immediately after the zone wherein the surfaces of said oppositely rotating roller and drum are closest to one another for partly retaining the entrained film of mix on said roller so as to thereby produce a bead of mix which extends across the distance between said roller and said cooking drum to touch and coat said cooking surface of said drum, to start the cooking of a pancake; and subsequently

disengaging said retaining member from said roller so as to thereby terminate the formation of said bead of mix, thereby terminating the application of mix to said cooking surface.

4,046,925

ACIDIFIED MILK PRODUCT AND METHOD OF PRODUCING THE SAME

Robert S. Igoe, San Diego, Calif., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 577,145, May 13, 1975, abandoned. This application May 3, 1976, Ser. No. 682,292

Int. Cl.[2] A23L 1/04

U.S. Cl. 426—573 **16 Claims**

1. A gel-forming composition for use in a blend comprising fruit juice and milk or fruit juice and cream, the blend having a pH below about 4.5, said gel forming composition comprising from about 20% to about 50% xanthan gum, from about 10% to about 45% locust bean gum, and from about 30% to about 50% carboxymethyl cellulose, the percentages being based on the total weight of the gel-forming composition and chosen so that the total is 100%.

4,046,926

NON-DAIRY CREAMER COMPOSITIONS

David Stirling Gardiner, Cornhill-on-Tweed, England, assignor to General Foods Ltd., Banbury, England

Filed July 30, 1976, Ser. No. 710,065

Int. Cl.[2] A23D 5/00

U.S. Cl. 426—613 **8 Claims**

1. A process for the preparation of a non-dairy creamer powder composition having enhanced feathering resistance which comprises forming an emulsion comprising from 20 to 40% by weight on a dry basis of fat, from 3 to 15% by weight of sodium caseinate, from 35 to 65% by weight of carbohydrate and including as a buffering agent a mixture of effective amounts of sodium carbonate and a phosphate or a citrate at a level from 1 to 4% by weight and drying said emulsion.

4,046,927

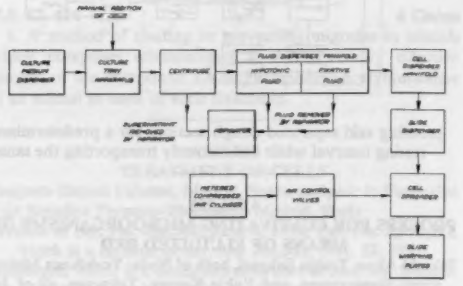
PROCESS FOR SEMI-AUTOMATED PRODUCTION OF MAMMALIAN CELL SLIDES

John Melnyk, 1316 Cerritos Drive, Laguna Beach, Calif. 92651

Filed Nov. 29, 1976, Ser. No. 745,675

Int. Cl.[2] C12B 3/00, 9/00

U.S. Cl. 427—2 **5 Claims**



1. A process for semi-automated production of mammalian cell slides, comprising:

adding a suitable culture medium from a dispenser into a plurality of culture tray means;

adding mammalian cells to the culture medium;

incubating said cells in the culture medium for a suitable period of time and at a suitable temperature in said plurality of culture tray means;

centrifuging the mixture of culture medium and said cells while in said culture tray means to produce a supernatant;

removing the supernatant by aspirator means simultaneously from said plurality of culture tray means, leaving said cells in said culture tray means;

adding hypotonic fluid to said cells in said plurality of culture tray means simultaneously from a dispenser while at the same time initiating and maintaining shaking of said culture tray means;

removing said hypotonic fluid and adding a fixative fluid to said cells in said plurality of culture tray means simultaneously from a dispenser, while at the same time initiating and maintaining shaking of said culture tray means;

removing said fixative fluid and collecting the resulting cell suspension in a cell dispenser manifold;

discharging the cell suspension from said cell dispenser manifold simultaneously on a plurality of slides;

and spreading said cell suspension over the surfaces of said plurality of slides with an air blast.

4,046,928

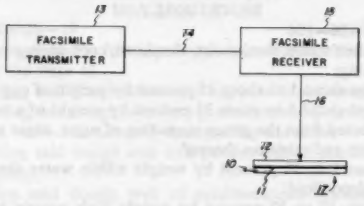
ELECTRORESISTIVE PAPER

Alptekin Akman, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 8, 1973, Ser. No. 322,048

Int. Cl.[2] B05D 5/12; B32B 29/00

U.S. Cl. 427—12 **6 Claims**



1. An electrosensitive marking blank comprising:

a. a substrate;
b. a blushed opaque conductive layer coated on said substrate said conductive layer including conductive carbon in a film-forming binder of cellulose acetate butyrate; and
c. a contrasting masking layer overlaying said conductive coating said masking layer containing a pigment and film-forming binder said masking layer completely overlaying said conductive coating in order to provide contrast with the conductive layer upon electrical stylus removal of the opaque masking layer.

4,046,929

ATTENUATION SPOT FILTERS MANUFACTURING PROCESS

Rein Randmae, Fort Salonga, N.Y., assignor to Vicon Industries, Inc., Farmingdale, N.Y.

Filed May 9, 1975, Ser. No. 576,027
Int. Cl.² G02B 5/22; B05D 1/20, 1/36, 5/06
U.S. Cl. 427—164 **2 Claims**

1. A method for manufacturing an attenuation spot filter, comprising the steps of:
a. rotating a substrate about a vertical axis above a flame,
b. varying the vertical distance between said flame and said substrate whereby a carbon film having a greater density toward its center and a gradient density outwardly of the center is caused to be deposited upon said substrate, and
c. coating said carbon film deposit with a protective coating by:
i. floating said carbon film deposit bearing substrate in a floatation fluid,
ii. covering said carbon film deposit with a resin, and
iii. drying said resin.

4,046,930

TREATMENT OF PAPER AND TEXTILE FABRICS WITH EMULSIFIED EPOXY-SILICONES

Gordon Carlton Johnson, Armonk, and Richard Bruce Metzler, Ossining, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 521,512, Nov. 6, 1974, abandoned. This application July 6, 1976, Ser. No. 702,471
Int. Cl.² B05D 3/02; C08G 47/04; D06M 15/66
U.S. Cl. 427—387 **19 Claims**

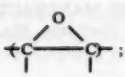
1. In the method of imparting water repellency to paper and textile fabric substrates which comprises contacting the substrates with a water-dispersible aqueous emulsion of an epoxy-silicone having the formula:

$$MD_xU_yM'_q$$

wherein D represents an R_2SiO unit in which R is a monovalent hydrocarbon radical free of acetylenic unsaturation; U represents a unit selected from the class consisting of

$$\begin{array}{l} R' \\ | \\ R{-}Si{-}O \end{array} \text{ and } R'SiO_{3/2}$$

in which R is as defined above and R' a monovalent organic radical containing at least one vicinal epoxy group,



M and M' are in each occurrence an endblocking unit having the formula

$$R''_{3-a}\begin{array}{l} R'_a \\ | \\ SiO_{1/2} \end{array}$$

in which R'' is a monovalent hydrocarbon radical free of olefinic unsaturation, R' is as defined above, a has a value from 0 to 1 inclusive, q has a value of 1 when U is an

$$\begin{array}{l} R' \\ | \\ R{-}SiO \end{array}$$

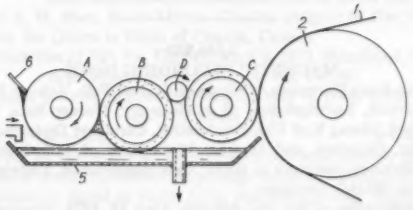
unit and a value of $(y + 1)$ when U is an $R'SiO_{3/2}$ unit, x is an integer having a value of from 10 to about 10^5, y is an integer having a value of from 1 to about 10^2, the sum of x, y and q being such that the epoxy-silicone compound MD_xU_yM' has a molecular weight of from about 10^3 to about 10^6 and the ratio of epoxy-containing units to units containing no epoxy groups is within the range of from about 0.001 to 0.5, said epoxy-silicone being employed in an amount of from about 0.01 to about 4 weight % based on the weight of dry substrate, the improvement which consists of producing an aqueous emulsion for application to said substrates by emulsifying said epoxy-silicone in water using about 1 to 25 weight %, based on the weight of said epoxy-silicone, of an anionic sulfonate emulsifier capable of producing an aqueous emulsion of said epoxy-silicone having a maximum water absorption on paper at 49° C. for 3 minutes of about 0.6 g./100 cm² when measured by the Cobb Test in accordance with TAPPI-T-441.

4,046,931

METHOD AND APPARATUS FOR APPLYING COATING COMPOSITIONS TO STRIP MATERIAL

Robert Arthur Innes, Amherstview; Gregory Preston Michael Enright, and Garnet Lloyd Derrick, both of Kingston, all of Canada, assignors to Alcan Research and Development Limited, Montreal, Canada

Filed Feb. 18, 1975, Ser. No. 550,750
Claims priority, application United Kingdom, Feb. 19, 1974, 7611/74
Int. Cl.² B05D 1/28
U.S. Cl. 427—428 **13 Claims**



1. An apparatus for applying a coating material to a metal strip comprising a deformable-covered coating take-up roll, means for supplying a coating material to said roll, a hard metering roll in contact therewith to perform a primary metering function on said coating material on said take-up roll, means for removing coating material from the surface of the metering roll at a position remote from its line of contact with the take-up roll, a hard transfer roll in contact with said take-up roll at a point downstream from the line of contact with said metering roll and a deformable-covered applicator roll in contact with said hard transfer roll, said hard transfer roll being of small diameter and means for rotating all said rolls in the same sense at controllable velocities so that at lines of mutual contact the surfaces of the rolls travel in opposite directions with said hard transfer roll rotating at a peripheral speed greater than that of said take-up roll and said applicator roll rotating at a peripheral speed greater than that of said transfer roll; said supplying means comprising means for bringing said coating material into contact with the surface of said take-up roll at a locality spaced from the line of contact of said transfer roll with said take-up roll; and said metering roll being

disposed for contact with said take-up roll along a line between said last-mentioned locality and the line of contact of said transfer roll with said take-up roll in the direction of surface travel of said take-up roll.

6. A method of applying a film of a coating material to a moving metal strip comprising taking up a continuous film of coating material on a rotating first deformable-covered roll, contacting said first deformable-covered roll with a hard roll having its surface travelling in the opposite direction thereto at the line of contact with said first deformable-covered roll to form a metered film on the surface of said first deformable-covered roll, continuously removing coating material from the surface of said hard roll, contacting the surface of said first deformable-covered roll, carrying said metered film, with a small diameter hard transfer roll having its surface travelling in the opposite direction thereto at the line of contact with said first deformable-covered roll to transfer coating material to said hard transfer roll, contacting said hard transfer roll with a second deformable-covered roll having its surface travelling in the opposite direction thereto at the line of contact with said hard transfer roll to transfer coating material to said second deformable-covered roll, and then transferring said coating material from said second deformable-covered roll to moving strip metal by contacting said second deformable-covered roll with a strip travelling in opposite direction thereto at the line of contact with said second deformable-covered roll, said method including rotating said hard transfer roll at a peripheral speed greater than said first deformable-covered roll, and rotating said second deformable-covered roll at a peripheral speed greater than said transfer roll; the step of taking up coating material comprising bringing said coating material into contact with the surface of the first deformable-covered roll at a locality spaced from the line of contact of the first deformable-covered roll with said hard transfer roll, and said first-mentioned hard roll being disposed for contact with said first deformable-covered roll along a line between said last-mentioned locality and the line of contact of said hard transfer roll with said first deformable-covered roll in the direction of surface travel of said first deformable-covered roll.

4,046,932

MAGNETIC RECORDING DISCS

Hans-Joerg Hartmann, Breinsheim; Roland Falk, Achern; Peter Gawlik, Ludwigshafen, all of Germany; Werner Balz, Bedford, Mass.; Karl Uhl, Frankenthal, Germany; Dieter Schaefer, Germany, and Herbert Motz, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 460,469, April 12, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,182

Claims priority, application Germany, Apr. 17, 1973, 2319363

Int. Cl.² H01F *10/02*

U.S. Cl. 428—64 **6 Claims**

1. A magnetic recording disc which comprises a base and an adhesive magnetic coating composition thereon, said coating comprising a binder and finely divided magnetic pigment dispersed in said binder, said binder comprising a mixture of polycondensates consisting essentially of

A. 60 to 70% by weight of a solid curable polycondensate of 2,2-bis-(4-hydroxyphenyl)-propane and epichlorohydrin, with and epoxy equivalent weight from about 400 to 2,500 and having a melting point from about 50° to 150° C,

B. 10 to 30% by weight of a curable allyloxybenzene-formaldehyde condensate of the resol type with free methylol groups or methylol groups etherified with a lower alcohol, and having a molecular weight of less than 1,000, and

C. 10 to 30% by weight of a curable melamine-formuladehyde condensate with more than two methylol groups etherified with n-butanol or isobutanol and having a molecular weight of less than 2,500.

4,046,933

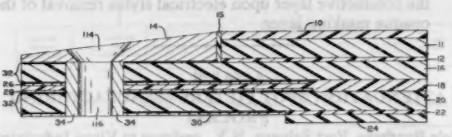
LAMINATED WINDOW STRUCTURE AND ITS METHOD OF FABRICATION

John E. Stefanik, Lower Burrell, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 16, 1975, Ser. No. 613,790

Int. Cl.² B32B *3/02*

U.S. Cl. 428—81 **7 Claims**



1. A transparent laminated window or canopy for aircraft and the like comprising a vision area comprising alternate plies of a rigid, transparent glazing material selected from the class consisting of glass, polycarbonates, acrylic esters and polyesters, and of a flexible interlayer material selected from the class consisting of polyurethanes, silicones and polyvinyl acetals and a marginal edge portion unitary with and surrounding said vision area and comprising a reinforcement member bonded to a ply of said interlayer material and a fabric tape impregnated with a silicone elastomeric adhesive and having substantially uniform thickness after said fabric is impregnated bonded between said reinforcing member and an adjacent surface of one of said plies of rigid, transparent glazing material, said ply of interlayer material being reduced in thickness in said marginal edge portion along one surface thereof to receive said reinforcing member.

4,046,934

FIBROUS BUILDING ELEMENTS

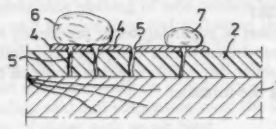
Hans Hjalmar Gustafson, Tradgardsgatan 22, S-172 38 Sundbyberg, Sweden

Filed Dec. 11, 1975, Ser. No. 639,907

Claims priority, application Sweden, Jan. 9, 1975, 7500188

Int. Cl.² B05D *5/00*; B32B *3/00*

U.S. Cl. 428—155 **3 Claims**



1. A fibrous building element which is coated on at least the outwardly facing side thereof with a layer of a water-base paint which forms a cracked surface in a manner to permit vapor to diffuse through said building element and a second layer of a wax emulsion applied to the outer surface of said water-base paint to prevent the penetration of water into the building element through the cracked surface thereof.

4,046,935

RIGID-WHEN-WET PAPERBOARD CONTAINERS AND THEIR MANUFACTURE

Robert M. Wilkinson, Florissant, Mo., and James R. Lyon, Godfrey, Ill., assignors to Altor Box Board Company, Altor, Ill.

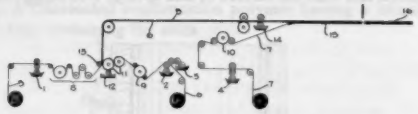
Division of Ser. No. 277,646, Aug. 3, 1972, Pat. No. 3,886,019, which is a continuation-in-part of Ser. No. 39,086, May 20, 1970, abandoned. This application Apr. 14, 1975, Ser. No. 568,131

Int. Cl.² B32B *3/28*

U.S. Cl. 428—182 **7 Claims**

1. The process of making rigid-when-wet container-board comprising, surface-treating one face of a sheet of paperboard without substantially effecting the moisture absorbing attri-

butes of its opposite face by printing thereon discretely metered increments of a mixture of phenolic resin in a liquid vehicle in minutely spaced relationship, surface-treating both faces of a second sheet of paperboard with a mixture of phenolic resin in a liquid vehicle, and surface-treating one face of a third sheet of paperboard without substantially effecting the moisture absorbing attributes of its opposite face by printing thereon discretely metered increments of said mixture of phe-



nolic resin in a liquid vehicle in minutely spaced relationship, immediately removing a substantial part of said liquid vehicle from the said first, second, and third sheets, and after the vehicle is in substantial part removed from all of said sheets, corrugating said second sheet, and the sheets are laminated with said one face of said first-mentioned sheet and third sheet in at least partial contact with opposite faces of said second sheet.

4,046,936

IMPRINTED COMPRESSIBLE FOAM ARTICLE AND METHOD OF MANUFACTURE

Joseph D. Schachter, 866 Elm Street, Winnipeg, Manitoba, Canada

Filed Jan. 7, 1977, Ser. No. 757,663
Claims priority, application Canada, Dec. 29, 1976, 268,782
Int. Cl.² B32B *3/00, 7/14*
U.S. Cl. 428—195 **11 Claims**

1. A multicellular compressible article comprising
(a) a volume of compressible foam cut ot predetermined dimensions,
(b) a design imprint on the surface of the foam desposited by direct heat transfer sublimation of sublistatic ink.

4,046,937

MELAMINE-ALDEHYDE RESIN AND POSTFORMABLE LAMINATE MADE THEREFROM

Harold O. McCaskey, Jr., Allendale, and Lenon G. Brooker, Hampton, both of S.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 10, 1974, Ser. No. 513,785
Int. Cl.² B32B *29/00, 29/04, 15/14, 21/04*
U.S. Cl. 428—211 **68 Claims**

1. A composition comprising
1. an aldehyde and melamine in a mole ratio of about 1.5 to about 6;
2. about 1 to about 50% (by weight based on melamine weight) of a water-soluble, aliphatic diglycidyl ether; and
3. sufficient water to form a solution of about 15 to about 65% solids.

13. An article comprising an absorbent sheet impregnated with an A-staged composition which comprises:
1. an aldehyde and melamine in a mole ratio of about 1.5 to about 6;
2. about 1 to about 50% by weight based on melamine weight of a water-soluble, aliphatic diglycidyl ether; and
3. sufficient water to form a solution of about 15 to about 65% solids.

31. A laminate comprising a postformable core stock to which is bonded at least one absorbent sheet impregnated with a C-staged composition comprising:
A. an aldehyde and melamine in a mole ratio of about 1.5 to about 6;
B. about 1 to about 50% by weight based on melamine weight of a water-soluble, aliphatic diglycidyl ether; and
c. sufficient water to form a solution of about 15 to about 65% solids.

52. A method of making a postformable laminate comprising:
A. preparing an A-staged composition which comprises
1. an aldehyde and melamine in a mole ratio of about 1.5 to about 6;
2. about 1 to about 50% by weight based on melamine weight of water-soluble, aliphatic diglycidyl ether; and
3. sufficient water to form a solution of about 15 to about 65% solids.
B. applying said composition to an absorbent sheet to a weight ratio of composition solids to absorbent sheet of about 1.2 to about 4.0;
C. reacting said composition to the B-stage;
D. forminga stack of at least one of said sheets with a postformable core stock; and
E. curing said stack to the C-stage.

4,046,938

INSULATING MATERIAL

Kevork A. Torossian, and Leo S. Kohn, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 277,482, Aug. 2, 1972, abandoned. This application July 23, 1976, Ser. No. 708,256
Int. Cl.² B32B *17/10, 27/36;* **H01B** *7/28;* **B32B** *27/38*
U.S. Cl. 428—285 **7 Claims**

1. Composite electrical insulation comprising at least one layer of electrical insulating tape, said tape consisting essentially of (a) at least one electrical insulating layer, (b) thermosetting resin impregnant for (a) and adhering to at least one outer surface of (a) a protective polymer film which is soluble in said resin at the curing temperature of said resin, said polymer film being selected from the group consisting of polycarbonate, polysulfone and polyphenylene oxide.

4,046,939

GAS RESISTANT FOAM MATERIALS

John A. H. Hart, South March, Canada, assignor to Her Majesty the Queen in Right of Canada, Canada

Continuation of Ser. No. 132,611, April 8, 1971, abandoned. This application Jan. 7, 1976, Ser. No. 647,097
Claims priority, application Canada, May 4, 1970, 81768
Int. Cl.² B32B *5/18*
U.S. Cl. 428—311 **9 Claims**

1. An air and water permeable open cell solid flexible polyurethane foam resistant to the passage therethrough of noxious chemicals in liquid or vapor form, said foam having dispersed therein particulate activated carbon of average particle size in the range 7 to 10 microns and in an amount of at least 10% by weight of said foam and not in excess of 12 milligrams per sq. cm. of foam, said activated carbon particles being bonded in said foam by an acrylic elastomeric binder which is substantially free from substances which would substantially deactivate the activated carbon particles, said binder being present in an amount from 15 to 100 parts by weight per 100 parts by weight of said carbon.

4,046,940

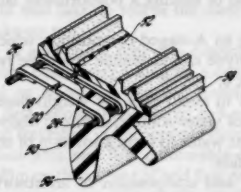
WEATHERSTRIP STRUCTURE

John Prikkel, III, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 15, 1975, Ser. No. 640,724
Int. Cl.² E06B *7/215;* **B32B** *15/06, 15/14*
U.S. Cl. 428—313 **3 Claims**

1. An elongated elastomeric body having a longitudinally extending U-shaped section and embedded in said U-shaped section, a reinforcing and retention aiding core comprising a plurality of separate U-shaped resilient metal strips disposed transversely to the longitudinal axis of the body in closely and

uniformly spaced relation therealong with the ends of said strips being bent around and thereby securely attached to



flexible continuous fibrous cords longitudinally disposed in each side wall of said U-shaped section.

4,046,941

SUPPORT SHEET WITH SENSITIZED COATING OF ORGANIC ACID SUBSTANCE AND ORGANIC HIGH MOLECULAR COMPOUND PARTICULATE MIXTURE

Toranosuke Saito, Kobe; Jujiro Kohno, Takatsuki; Daiichiro Tanaka, Arao, and Shinichi Oda, Amagasaki, all of Japan, assignors to Sanko Chemical Company Ltd. and Kanzaki Paper Manufacturing Company, Ltd., both of, Japan

Division of Ser. No. 401,552, Sept. 27, 1973, Pat. No. 3,924,027.
This application Aug. 21, 1975, Ser. No. 606,548
Claims priority, application Japan, Sept. 27, 1972, 47-97430
Int. Cl.[2] B32B *5/16*
U.S. Cl. 428—323 **21 Claims**

1. A sheet material for use in a pressure-sensitive copy system, comprising a support sheet and a coating thereon sensitized to produce color on contact with a chromogenic material, said coating containing a particulate mixture having uniformly dispersed therein in the form of fine powders comprising (a) 100 parts by weight of an acidic organic substance selected from the group consisting of aromatic carboxylic acids and polyvalent metal salts thereof, and (b) from 5 to 300 parts by weight of an organic high molecular compound selected from the group consisting of polystyrene, styrene copolymers, a-methylstyrene polymers, a-methylstyrene copolymers, polyvinyl chloride, vinylchloride copolymers, vinylidenechloride copolymers, polychloroprene, cyclopentadiene polymers, cyclopentadiene copolymers, acrylic ester polymers, acrylic ester copolymers, acrylic acid copolymers, methacrylic ester polymers, methacrylic ester copolymers, methacrylic acid copolymers, vinyl acetate polymers, vinyl acetate copolymers such as ethylene-vinylacetate copolymers, acrylonitrile copolymers, acrylamide copolymers, allylalcohol copolymers, benzylchloride polycondensation products, benzylchloride copolycondensation products, meta-xylene-formaldehyde condensates, diphenyl-formaldehyde condensates, and diphenyl-meta-xylene-formaldehyde copolycondensation products, said organic high molecular compound having a molecular weight of at least 400 and in a non-fluid or solid state at normal temperature, and being compatible with said acidic organic substance.

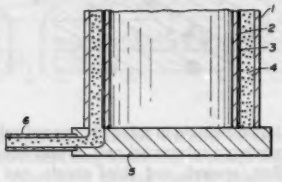
4,046,942

METHOD OF PRODUCING AN ENDLESS FOLLOWER, AND PRODUCT PER SE

Kurt van Wersch, Wegberg, Germany, assignor to A. Monforts, Monchengladbach, Germany

Filed Nov. 29, 1974, Ser. No. 528,331
Claims priority, application Germany, Nov. 28, 1973, 2359170
Int. Cl.[2] B29D *27/04;* **B32B** *7/00*
U.S. Cl. 428—255 **4 Claims**

1. Method of producing an entrainer for squeezing or dyeing textile fabric webs with the aid of a foulard which comprises inserting a spread-out endless textile web into an annular mold having an annular space bounded by an outer wall having a continuous surface and an inner wall having a continuous surface with said spread-out endless textile web disposed on said inner wall having a continuous surface, both the web and the annular mold having a periphery and a width corresponding to the periphery and width of the entrainer to be formed and thereafter filling the annular mold with a material that hardens to form a sponge to produce an entrainer having an endless textile web inlaid with an endless sponge web with the sides of said entrainer adjacent said walls having continuous surfaces, and with the surface of said sponge web being free of



seams and joints, permiting said material to harden in said mold; removing the skins at both end surfaces of the hardened annular sponge; passing a cleansing medium through the sponge from one end surface to the other end surface to wash out unreacted materials; and removing the outer surface skin from said cleansed product to form said entrainer.

4. Endless entrainer adapted for squeezing or dyeing textile fabric webs with the aid of a foulard which entrainer is prepared according to the method of claim **1.**

4,046,943

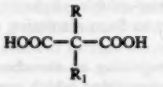
MALONIC ACID DERIVATIVE COMPOSITION FOR FORMING THERMOPARTICULATING COATING

James D. B. Smith, Turtle Creek, and David C. Phillips, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 568,219, April 15, 1975, Pat. No. 3,995,489.
This application July 16, 1976, Ser. No. 706,089
Int. Cl.[2] C08K *5/01;* **G01K** *13/02*
U.S. Cl. 428—339 **15 Claims**

1. A composition comprising

1. at least one compound having the general formula



which decomposes to produce detectable particles between about 60° to about 200° C, where R is selected from the group consisting of alkyl from C_1 to C_{10}, aryl, alkyl aryl from C_1 to C_{10}, cycloaliphatic, and heterocyclic, and R_1 is selected from the group consisting of R and hydrogen; and

2. a solution of at least one resinous carrier curable and stable at 60° C and unreactive with said compound.

13. A thermoparticulating coating comprising a solid layer of a composition according to claim **1** on a substrate.

15. A coating according to claim **13** which is about 1/16 to about ¼ inch thick.

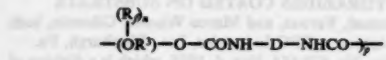
4,046,944

FLUORINATED CONDENSATION POLYMERS AND THEIR USE AS SOIL RELEASE AGENTS

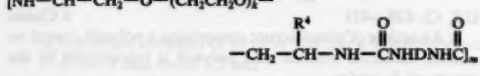
Karl Friedrich Mueller, New York, and Robert A. Falk, New City, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 6, 1976, Ser. No. 674,188
Int. Cl.[2] B32B 27/04; C08G 18/50; D06M 15/68
U.S. Cl. 428—262 20 Claims

1. A fluorinated condensation polymer having a chemical structure containing the units



and



in the ratio of 15–70% by weight of the fluorinated units to 30–85% by weight of the non-fluorinated polyethyleneoxide units, wherein

R_f is a branched or linear perfluoroalkyl or perfluorooxyalkyl group of 5–18 carbons,

R^3 is an aliphatic triradical of 2–50 carbon atoms selected from the group consisting of branched or straight chain alkylene, alkylenethioalkylene, alkyleneoxyalkylene and alkyleneiminoalkylene,

R^4 is hydrogen or methyl,

D is the organic divalent radical of a diisocyanate,

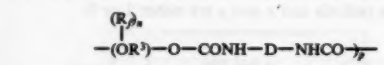
k is 8–100,

m is an integer of 1 to 5,

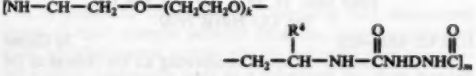
n is 1 or 2, and

p is an integer of 1 to 5.

20. A soil-releasing textile, consisting essentially of textile fibers coated with a fluroinated condensation polymer having a chemical structure containing the units



and



in the ratio of 15–70% by weight of the fluorinated units to 30–85% by weight of the non-fluorinated polyethyleneoxide units wherein

R_f is a branched or linear perfluoroalkyl or perfluorooxyalkyl group of 5–18 carbons,

R^3 is an aliphatic triradical of 2–50 carbon atoms selected from the group consisting of branched or straight chain akylene, alkylenethioalkylene, alkyleneoxyalkylane and alkyleneiminoalkylene,

R^4 is hydrogen or methyl,

D is the organic divalent radical of a diisocyanate,

k is 8–100,

m is an integer of 1 to 5,

n is 1 or 2, and

p is an integer of 1 to 5.

4,046,945

PROCESS FOR THE BONDING OF FILMS AND MOLDED COMPONENTS

Fritz Baxmann; Albert Frese; Hermann Röben, all of Marl, and Jürgen Wolpers, Wulfen, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Jan. 13, 1975, Ser. No. 540,534
Claims priority, application Germany, Jan. 18, 1974, 2402259
Int. Cl.[2] D04H 1/16; B32B 17/10, 27/34; C09J 3/14
U.S. Cl. 428—282 15 Claims

1. In a process for bonding unheated pieces of elastic polymers and thermoplastic polymers in film or shaped form to each other or to a suitable substrate selected from the group consisting of wool, wood, masonry, concrete, glass, metals, polyesters and roofing felt, the improvement which comprises employing as the bonding agent an adhesive composition heated at a temperature of up to 250° C. and consisting essentially of:

a. 5–95% by weight of a solid or semi-solid atactic poly-α-olefin or poly-α-olefin mixture having a reduced specific viscosity of 0.05–5.0 dl./g.;

b. 95–5% by weight of liquid atactic polybutene or polybutene mixture having a viscosity of 150–1,000,000 cp./20° C. which contains no readily boiling components that boil below 150° C. at 15 mm. Hg pressure; and

c. up to 50% by weight of the adhesive composition of an inert, water insoluble inorganic filler.

8. An article of manufacture comprising a section of elastomer film bonded to another section of elastomer film or to a substrate selected from the group consisting of wool, wood, masonry, concrete, glass, metals, polyesters and roofing felt by spreading onto an unheated section or substrate an adhesive composition consisting essentially of:

a. 5–95% by weight of a solid or semi-solid atactic poly-α-olefin or poly-α-olefin mixture having a reduced specific viscosity of 0.05–5.0 dl./g.;

b. 95–5% by weight of liquid atactic polybutene or polybutene mixture having a viscosity of 150–1,000,000 cp./20° C. which contains no readily boiling components that boil below 150° C. at 15 mm. Hg pressure; and

c. up to 50% by weight of the adhesive composition of an inert, water insoluble inorganic filler.

4,046,946

LITHOGRAPHIC PRINTING PLATE

Michael J. Shaw, Kalamazoo, Mich., assignor to Allied Paper Incorporated, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 493,528, Aug. 1, 1974, Pat. No. 3,922,441. This application Nov. 24, 1975, Ser. No. 634,899
Int. Cl.[2] B41C 1/10; B41N 1/08; B32B 13/08
U.S. Cl. 428—325 12 Claims

1. In a lithographic printing plate having a paper base and a lithographic printing surface thereon comprising a face coating of positively charged colloidal silica and insolubilized hydrophilic polymer, in the ratio by weight of about two parts silica:one part polymer to about six parts silica:one part polymer, the improvement for reduction or elimination of a barrier coat on said base which comprises including in the face coating from about 10% to about 60% by weight of a fine particle size pigment which is non-flocculating and about 5% to about 30% by weight of a resinous binder which is cationic, nonionic or mixed cationic and nonionic, the hydrophilic polymer comprising about 5% to about 25% of the face coating and the positively charged colloidal silica comprising about 10% to about 70% by weight of the face coating, said weight percents being based on the dried lithographic printing surface coating free of volatiles.

11. The method of claim 9 wherein said coating composition is applied at the rate of about 2–20 pounds per ream of paper base.

4,046,947
MATERIAL AND METHODS FOR BONDING TREADS TO TIRES

Edwin T. Brodie, Muscatine, Iowa, assignor to Bandag Incorporation, Muscatine, Iowa

Division of Ser. No. 439,639, Feb. 4, 1974, Pat. No. 3,951,720, which is a continuation of Ser. No. 149,834, June 3, 1971, abandoned, which is a continuation-in-part of Ser. No. 612,026, Jan. 26, 1967, abandoned. This application Sept. 8, 1975, Ser. No. 611,253

Int. Cl.[2] B29H 9/00

U.S. Cl. 428—352 8 Claims

1. A single ply strip of bonding medium for bonding a prevulcanized tread strip to the periphery of a tire, said strip containing a homogeneous mixture of unvulcanized rubber, vulcanizing agent and a vulcanizing accelerator system capable of vulcanizing said unvulcanized rubber at temperatures below about 210° F, said bonding medium being compounded and rendered stable against premature vulcanization at a room temperature of 104° F separate incorporation of the accelerator and vulcanizing agent into the rubber, said strip having applied to each of its opposite surfaces a removable protective film, said strip being wound in a loose roll whereby no appreciable pressure is exerted on the strip.

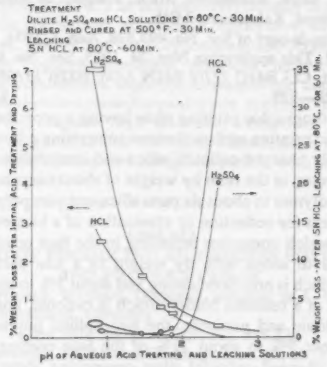
4,046,948
ACID RESISTANT GLASS FIBERS

Isaac A. Zlochower, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 566,471, April 9, 1975, abandoned, which is a continuation-in-part of Ser. No. 455,471, March 27, 1974, abandoned. This application June 2, 1976, Ser. No. 692,160

Int. Cl.[2] B32B 9/00; C03C 13/00; D02G 3/00

U.S. Cl. 428—392 2 Claims


TREATMENT
DILUTE H_2SO_4 AND HCL SOLUTIONS AT 80°C.- 30 MIN.
RINSED AND CURED AT 500°F.- 30 MIN.
LEACHING
5N HCL AT 80°C.- 60 MIN.
H_2SO_4
HCL
HCL
H_2SO_4
% WEIGHT LOSS - AFTER INITIAL ACID TREATMENT AND DRYING
% WEIGHT LOSS - AFTER 5N HCL LEACHING AT 80°C. FOR 60 MIN.
pH OF AQUEOUS ACID TREATING AND LEACHING SOLUTIONS

1. A glass fiber having a dual composition, one composition comprising the core of the fiber, the second composition comprising the surface of the fiber and in which the surface composition has a high concentration of SiO_2 therein, the dual composition being formed by acid treating a glass fiber having a composition comprising by weight 52 to 58 SiO_2, 12 to 20 percent Al_2O_3, 12 to 25 percent CaO, 0 to 8 percent MgO, 0 to 13 percent B_2O_3, 0 to 3 percent $Na_2O + K_2O$ and 0 to 1 percent F_2, said acid treatment being conducted at a pH, temperature and time sufficient to produce a final glass composition having a surface containing 70 to 90 percent by weight SiO_2 and a final glass composition of the entire fiber of 52 to 64 percent by weight SiO_2.

4,046,949
NOVEL POLYMERS FROM REACTION OF TRICARBOXYLIC ANHYDRIDES AND HYDRAZINES OR HYDRAZIDES COATED ON SUBSTRATE

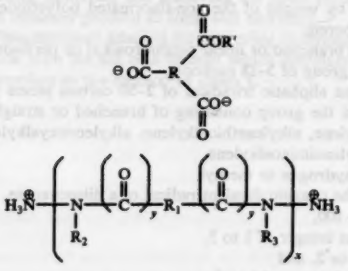
Karl F. Schimmel, Verona, and Marco Wismer, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 628,611, Nov. 4, 1975, which is a division of Ser. No. 511,337, Oct. 2, 1974, Pat. No. 3,969,566, which is a division of Ser. No. 369,629, June 13, 1973, Pat. No. 3,882,086. This application Nov. 16, 1976, Ser. No. 742,305

Int. Cl.[2] B32B 9/04

U.S. Cl. 428—411 4 Claims

1. An article of manufacture comprising a polysalt coated on a metal substrate wherein said polysalt is represented by the structural formula:



wherein R is trivalent organic radical having at least three carbon atoms, R' is an aliphatic cycloaliphatic monofunctional alkyl radical, R_1 is a divalent organic radical selected from the group consisting essentially of alkylene, arylene, and heterocyclic; R_2 and R_3 are monovalent alkyl, aryl, aralkyl, cycloalkyl or hydrogen radicals and x and y are either 1 or 0.

4,046,950
CHALCOGENATED TETRACENE ORGANIC METALS

Lawrence Clair Isett, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 18, 1976, Ser. No. 668,116

Int. Cl.[2] H01B 1/00

U.S. Cl. 428—411 20 Claims

1. A composition of matter comprising an ion-radical of the formula

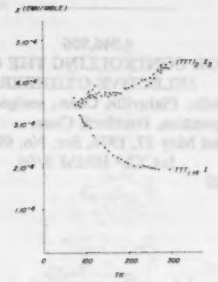
$$(D_2)^{a+}\ (A)^{a-}$$

wherein $(D_2)^{a+}$ is a chalcogenated tetracene complex cation selected from the group consisting of complex cations of tetrathiotetracene, tetraselenotetracene and tetratellurotetracene and A is an anion selected from the group consisting of

a. an inorganic anion selected from the group consisting of Br_3^-, I_3^-, F^-, Cl^-, Br^-, I^-, SCN^-, nitrate, sulfate, phosphate, fluoroborate, ferricyanide, molybdate, tungstate; and

b. an organic anion derived from an organic acid selected from the group consisting of: an aliphatic monocarboxylic acid, an aliphatic dicarboxylic acid, an aliphatic polycarboxylic acid, an unsaturated carboxylic acid, an aromatic carboxylic acid, a sulfonic acid, a heterocyclic acid con-

taining from 5 to 6 atoms in the heterocyclic nucleus and having at least one hetero atom selected from the group consisting of a nitrogen, oxygen, or sulfur atom; a monohydric phenol, and a polyhydric phenol; and



x represents the ratio of D to A and has a value between about 3 and about 1.5 and

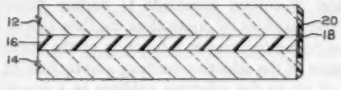
n is an integer between 1 and 5, said salt having an electrical resistivity less than about 10^{-2} ohm-cm at 295° K said resistivity decreasing with decreasing temperature.

4,046,951

LAMINATED TRANSPARENT ASSEMBLY WITH EDGE SEALING MEANS

John E. Stefanik, Lower Burrell, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 1, 1976, Ser. No. 737,467
Int. Cl.² B32B *3/02, 31/04;* B60J *1/06*
U.S. Cl. 428—412 **14 Claims**



1. A laminated transparency comprising two transparent layers of rigid material selected from the class consisting of glass, polycarbonates, acrylic plastics and other rigid transparent plastics commonly used as a substitute for glass bonded together by an interlayer of given thickness composed of a material selected from the class consisting of polyvinyl acetals and polyurethanes, a composite edge sealing system comprising a thin barrier layer of a fluorinated polymer selected from the class consisting of fluoroethylene polymers and copolymers of fluoroethylene and fluoropropylene having a width greater than the thickness of said interlayer and bonded to the edge of said interlayer completely around the perimeter thereof and completely covering said edge of said interlayer and a sealant layer having greater adhesion to the edge of said transparency than said barrier layer and composed of a composition selected from the class consisting of polysulfides, silicones and fluorosilicones at least coextensive in width with said barrier layer bonding said barrier layer to said transparency in such a manner as to improve the strength of the bond between said barrier layer and the edge of said interlayer.

4,046,952

MANUFACTURE OF OVERLAYED PRODUCT WITH PHENOL-FORMALDEHYDE BARRIER FOR POLYISOCYANATE BINDER

Philip D. Shoemaker, Baker, and Hobert O. McQueary, Sweet Home, both of Oreg., assignors to Ellingson Timber Co., Baker, Oreg.

Continuation-in-part of Ser. No. 404,026, Oct. 5, 1973, Pat. No. 3,919,017, and Ser. No. 441,278, Feb. 11, 1974, Pat. No. 3,930,110. This application Oct. 8, 1975, Ser. No. 620,850
Int. Cl.² B32B *33/00*
U.S. Cl. 428—423 **11 Claims**

1. A method of making an overlayed product with comminuted cellulosic material as the core thereof, comprising

producing a furnish of the comminuted cellulosic material by mixing therewith an organic polyisocyanate which operates upon the application of heat and pressure to bond the material,

preparing as assembly comprising a mat formed of such furnish and against a side of said mat a sheet overlay, with phenol-formaldehyde resin distributed in said overlay and presented by said overlay toward said mat, and

consolidating the furnish in said mat and said overlay to form an integral product by the application of heat and pressure, the phenol-formaldehyde resin during such consolidation forming a resinous barrier inhibiting penetration of the polyisocyanate through the overlay.

4,046,953

GLASSY MATERIALS FROM PLUMBITES AND CELLULOSICS

Truman L. Ward; Ruth R. Benerito, both of New Orleans, and Jacques J. Hebert, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 499,689, Aug. 22, 1974, Pat. No. 3,926,709. This application Sept. 8, 1975, Ser. No. 611,372
Int. Cl.² C03C *27/00*
U.S. Cl. 428—426 **1 Claim**

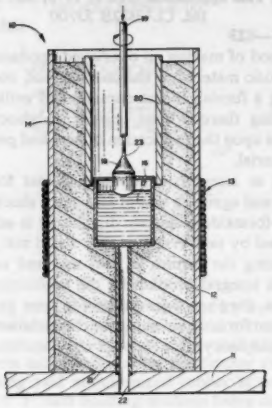
1. A substantially rigid, polymeric, and transparent or translucent material formed on and bonded to the surface of soda lime glass, porcelain, borosilicate glass, and 96% silica fused quartz glass, said material being the reaction product of a sodium plumbite-cotton intermediate with the said glass, said intermediate material having a lead content of about from 5 to 15%, and said reation product having resistance to etching by strong alkalies and mineral acids.

4,046,954

MONOCRYSTALLINE SILICATES

Michael F. Ehman, Mission Viejo, and Stanley B. Austerman, Villa Park, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 426,412, Dec. 19, 1973, Pat. No. 3,895,921.
This application Apr. 9, 1975, Ser. No. 566,547
Int. Cl.² B32B *9/04*
U.S. Cl. 428—446 **6 Claims**



1. A composite comprising a substrate formed of a monocrystalline silicate material selected from akermanite and mullite and a film of monocrystalline semiconductor material epitaxially disposed on said substrate.

4,046,955

PROTEINACEOUS ADHESIVE COMPOSITION

Carolyn N. Bye, Cinnaminson, N.J., assignor to National Casein of New Jersey, Riverton, N.J.

Filed Nov. 14, 1975, Ser. No. 631,821
Int. Cl.² B32B *27/06*; C08L *89/00*
U.S. Cl. 428—479 **10 Claims**

1. A two-part adhesive composition consisting essentially of one part comprising a dry mix of acid precipitated casein including solubilizing agents, and a second part comprising water and furfuryl alcohol to which the dry mix is added to form an aqueous homogeneous adhesive ready for application to substrates to be joined, the furfuryl alcohol being present in an amount of about 1.0% to about 35.0% by weight and the casein being present in an amount to supply a protein content of about 8.0% to about 22.9% by weight based upon the weight of the overall aqueous adhesive composition.

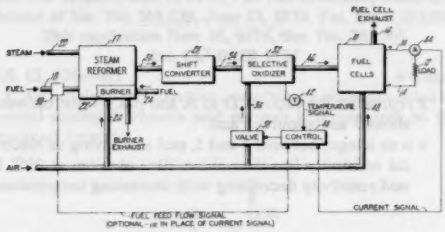
3. A structure comprising two wood product substrates bonded together by the adhesive composition of claim **1** in a cured condition.

4,046,956

PROCESS FOR CONTROLLING THE OUTPUT OF A SELECTIVE OXIDIZER

Salvatore Fanciullo, Plainville, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 27, 1976, Ser. No. 690,824
Int. Cl.² H01M *8/06*
U.S. Cl. 429—20 **1 Claim**



1. In an improved method of controlling the composition of the output from a selective oxidizer in a fuel cell system, the fuel cell system including a steam reformer, a shift converter, a selective oxidizer and a fuel cell, the method including the steps of supplying a hydrocarbon fuel and steam to the steam reformer, steam reforming the hydrocarbon fuel, conveying the steam reformed fuel to the shift converter, shift converting the steam reformed fuel, conveying the shift converted fuel to the selective oxidizer, supplying air to the selective oxidizer, conveying the output of the selective oxidizer to the fuel cell, and supplying air to the fuel cell, the improvement comprising:

sensing the operating temperature of the selective oxidizer;

sensing the current output of the fuel cell;

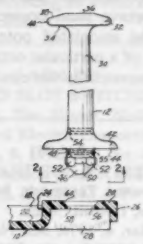
maintaining the operating temperature of the selective oxidizer within a narrow band selected to simultaneously minimize hydrogen consumption and maximize the conversion of carbon monoxide to carbon dioxide in the selective oxidizer by controlling the flow rate of the air to the selective oxidizer as a function of the operating temperature of the selective oxidizer and by biasing the flow rate of air to the selective oxidizer as a function of the current output of the fuel cell.

4,046,957

PIN STRUCTURE FOR MODULAR WIRING DUCT AND WIRE HOLDER SYSTEM

Philip W. Taylor, Burnet, Tex., and Rollin G. Scheidler, Howell, Mich., assignors to Taylor Industries, Inc., Howell, Mich.

Filed July 24, 1975, Ser. No. 598,572
Int. Cl.[2] H02G 3/02; F16B 19/00
U.S. Cl. 174—72 A 6 Claims



1. In a holder for supporting, containing and distributing a plurality of electrical conductors which comprises a base plate member made of plastic material and having a lower and an upper surface, a plurality of aligned apertures disposed substantially parallel to an edge of said plate member and pins on the upper surface of said plate member each disposed in one of said apertures, each of said pins being made of plastic material and having an elongated body portion provided at an end thereof with an enlarged head portion and at the other end thereof with a foot portion for mounting on said plate member, said foot portion comprising a radially extending flange portion in engagement with the upper surface of said base plate member and a tapered projecting portion inserted in said aperture, the improvement comprising said tapered projecting portion of said pin foot portion having laterally projecting flange sections of a major dimension slightly larger than the diameter of said aperture separated by substantially flat portions of a minor diameter substantially equal to the diameter of said aperture, a peripheral groove disposed proximate said projecting flange sections between said projecting flange sections and said radially extending flange portion, said groove being so dimensioned as to snugly fit in said aperture, said projecting flange sections being caused to laterally contract in part resiliently and in part permanently and the edge of said aperture being caused to correspondingly enlarge in part resiliently and in part permanently during insertion of said tapered projecting portion into said aperture and to subsequently resiliently respectively expand and contract partly for directly and positively holding the foot portion of said pin with said groove engaged in said aperture.

4,046,958

CABLE TERMINATION CONNECTOR ASSEMBLY AND METHOD

George E. Lusk, Woodstock, Ill., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.

Filed Jan. 7, 1976, Ser. No. 647,147
Int. Cl.[2] H02G 15/02; H01R 7/12
U.S. Cl. 174—73 R 27 Claims

1. A connector assembly for a high voltage cable termination comprising

means for receiving and securely retaining a plurality of wire strands of a current carrying center conductor of a high voltage power cable terminated by said cable termination, said receiving and retaining means comprising a unitary metallic member having a plurality of elongated apertures formed therein for selectively, respectively receiving a desired portion of said plurality of wire strands and

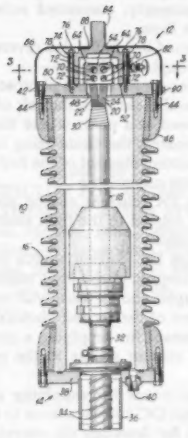
means for physically supporting said receiving and retaining means in said cable termination, said supporting means comprising an annular, metallic plate and fastening means for securing said metallic plate in said cable termination.

14. A cable termination for terminating an elongated end portion of an insulated high voltage power cable of the type having a current carrying center conductor formed by a plurality of wire strands comprising

an elongated dielectric housing having an elongated bore for receiving said end portion of said power cable interiorly of said housing, the longitudinal axis of said bore being disposed substantially parallel to the longitudinal axis of said end portion,

rigid means disposed at one longitudinal end of said dielectric housing for physically supporting said dielectric housing thereabove and

an electrical conductive connector assembly disposed at the other longitudinal end of said dielectric housing for making an electrical connection between said center conductor of said end portion of said power cable and an external electrical connector, said electrical conductive connector assembly comprising means for receiving, electrically connecting and securely retaining said plurality of wire strands of said center conductor, said receiving, electrically connecting and retaining means including a unitary conductive member having a plurality of elongated apertures formed therein, each aperture adapted to receive a desired portion of said plurality of wire strands, said desired portion comprising more than one wire strand.



24. A method of terminating an elongated end portion of an insulated high voltage power cable of the type having a current carrying center conductor formed by a plurality of wire strands comprising the steps of

disposing said end portion of said power cable interiorly of an elongated dielectric housing having an elongated bore such that the longitudinal axis of said disposed end portion lies substantially parallel to the longitudinal axis of said bore,

dividing said plurality of said wire strands into a predetermined number of discrete portions, each of said discrete portions having more than one wire strand, and

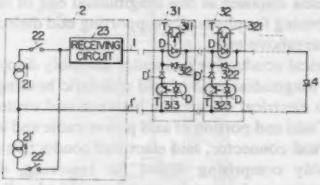
disposing each one of said discrete portions in one aperture of a unitary conductive member having a plurality of elongated apertures formed therein for respectively receiving one of said discrete portions of said plurality of wire strands.

4,046,959

DATA COMMUNICATION SYSTEM USING PHOTOCOUPLERS

Kazutaka Watanabe; Misao Shimizu, and Akihiro Sugawara, all of Musashino, Japan, assignors to Kabushikikaisha Yokogawa Denki Seisakusho, Tokyo, Japan

Filed June 7, 1976, Ser. No. 693,689
Claims priority, application Japan, June 13, 1975, 50-71504
Int. Cl.² H04L *15/00*
U.S. Cl. 178—68 **5 Claims**



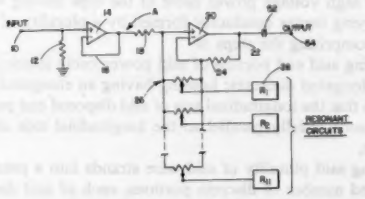
1. A data communication system comprising
a. a pair of transmission lines;
b. a plurality of subsidiary stations, each comprising
a first photocoupler having a light emitting element of rectifying property, connected serially to the pair of transmission lines,
a diode connected in parallel and reverse in polarity to the first photocoupler, and
a second photocoupler having photosensing element connected in parallel between the pair of transmission lines;
c. a diode disposed at a point where the two transmission lines are terminated, the diode being in the same polarity as the light emitting element of the first photocoupler; and
d. a master station comprising
a first constant DC current source producing a current forward with respect to the light emitting element of the first photocoupler,
a second constant DC current source producing a current reverse with respect to the light emitting element of the first photocoupler and forward with respect to the photosensing element of the second photocoupler,
a transmission means for supplying a current from the first constant DC current source to the pair of transmission lines,
and a receiving means for supplying a current from the second constant DC current source to the pair of transmission lines and for detecting the current supplied.

4,046,960

AUDIO FIDELITY FREQUENCY EQUALIZER SYSTEM

John R. Veale, 2925 Greenfield Ave., Los Angeles, Calif. 90025

Filed Dec. 31, 1975, Ser. No. 645,805
Int. Cl.² H03H *7/16*
U.S. Cl. 179—1 D **17 Claims**



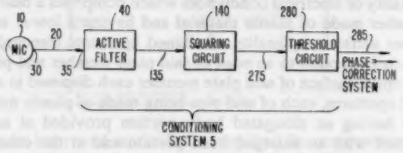
1. An audio fidelity frequency equalizer system comprising input means, an operational amplifier operatively connected to said input means, a resistive feedback path connected across an output of and an input to said operational amplifier, a plurality of discrete octave band potentiometer elements connected between said feedback circuit and said first named input to said operational amplifier and where said frequency controlling potentiometer elements are connected in parallel ralationship with respect to each other and with respect to the output of and the first named input to said operational amplifier, an individual resonant octave band control circuit connected with respect to each said octave band control potentiometer element, and each said resonant control circuit including an inductive-capacitive circuit therein comprised of an electronically active simulated inductor and a capacitor connected thereto, each said octave band control circuit operating in conjunction with the associated potentiometer element to adjust the frequency of a particular octave band as a function of the inductance generated by the electronically active simulated inductor.

4,046,961

CONDITIONING SYSTEM FOR TRANSDUCER SIGNALS

Michael Kenneth Brown, Tecumseh, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 4, 1976, Ser. No. 664,012
Int. Cl.² H03G *1/00*; G01D *15/18*
U.S. Cl. 179—1 P **31 Claims**



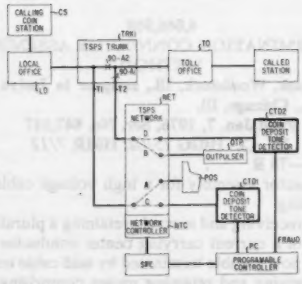
2. An interface unit for improving signal to noise ratios comprising transducer means for sensing changes from a given ambient level, means operative to receive signals from said transducer means for excluding relatively all frequencies extrinsic to a given band, and means connected to said extrinsic frequency exclusion means for amplifiably squaring signals therefrom and for transforming the squared signals into digital-like representations thereof whenever a given threshold level is exceeded.

4,046,962

CALLED PARTY FRAUD DETECTION IN AN AUTOMATED COIN SYSTEM

Barry William Rogers, Geneva, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 3, 1976, Ser. No. 720,158
Int. Cl.² H04M *1/66*
U.S. Cl. 179—6.3 R **14 Claims**



1. In a telephone system wherein a calling coin station and a called station are interconnected via a communication path, fraud detection and coin deposit detection apparatus, which comprises:

means for splitting the communication path into a first portion connected to the calling station and into a second portion connected to the called station,

a first coin tone detector connectable to said first portion for monitoring signals received from the calling station and indicating the presence of coin deposit signals, and

a second coin tone detector connectable to said second portion for monitoring signals received from the called station and for generating an alarm if coin deposit signals are detected therefrom.

4,046,963

TIMES SLOT SWITCHING

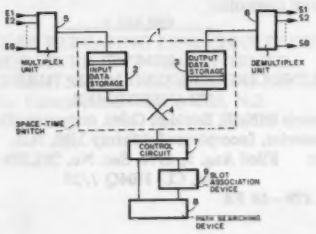
Hans Helmut Adelaar, The Hague, Netherlands, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,221

Claims priority, application France, Feb. 13, 1975, 75.04438

Int. Cl.² H04J *3/04*

U.S. Cl. 179—15 A **5 Claims**



1. A time slot association device for the establishment of a high quality connection between two subscribers utilizing several time slots within the same frame in a time switching network, said device being designed to associate with each input time slot *x* of each data storage reserved for said high quality connection an output time slot *y* from among the available output time slots such that the samples written in the data storages during these input time slots *x* are read during the output time slots *y* according to the order in which they were entered, said device including first means for detecting said input time slots *x* and output time slots *y* reserved for said high quality connection according to their chronological order within a frame, second means coupled to said first means to increase by one step a binary reference code *m* when said first means detects an output time slot *y* and to decrease by one step said binary code when an input time slot *x* is detected, third means coupled to said second means to identify one of the output time slots *y* corresponding to the maximum result obtained during the different increasings, and fourth means coupled to said first and third means to associate one of said time slots *y* corresponding to the maximum result respectively with the immediately preceding input time slot *x* of the high quality connection.

4,046,964

TESTING OF DIGITAL SYSTEMS

Thomas Henry Daugherty, Succasunna, and Dale Eugene Stone, Cedar Knolls, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 24, 1976, Ser. No. 699,659

Int. Cl.² H04J *3/14*

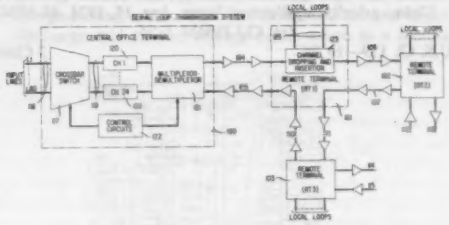
U.S. Cl. 179—15 BF **10 Claims**

1. An automatic channel testing system for bilateral multiplex pulse transmission systems having a plurality of data channels and at least one supervisory channel, said testing system comprising

a common test signal source including a supervisory signal source;

a common test signal detector including a supervisory signal detector;

means for sequentially connecting said test signal source and said test signal detector to each of said channels;



means included in each said channel for converting said test signals to digital pulses for transmission on said transmission system; and

means included in each said channel for converting received digital pulses from said transmission system into test signals.

4,046,965

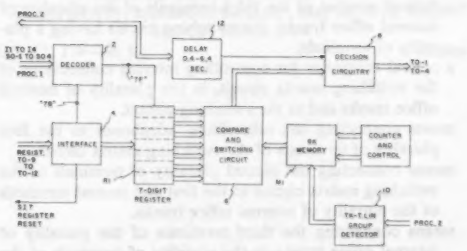
TOLL RESTRICTOR FOR A TIME DIVISION TELECOMMUNICATION SYSTEM

Andrew Kontomerkos, Jackson, Tenn., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,552

Int. Cl.² H04M *1/66*

U.S. Cl. 179—18 DA **9 Claims**



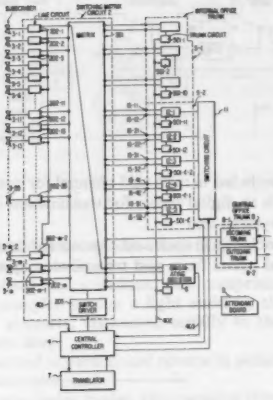
1. A toll restrictor for use with a TDM switching system, adapted to receive digits representing calling information for generating restrictor initiating signals, and comprising: a decoder, said decoder responding to said restrictor initiating signals for generating and transmitting a first coded signal to enable intitiation of a restricting function and to maintain the restricting function during the receipt of digits from a calling station, first memory means, interface circuits coupled responsive to said first coded signal to transmit digits received from a calling station to said first memory means, second memory means containing data identifying restrictions applicable to all potential calling stations, comparison means coupled to said first memory means and to said second memory means, said comparison means providing additional signals to said system indicating whether a call from said calling station may be allowed or denied and said decoder responsive to said additional signals to clear said restricting function.

4,046,966

CONFERENCE TRUNK CIRCUIT FOR AN EXCHANGE

Kiyoshi Urui, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Continuation-in-part of Ser. No. 568,248, April 15, 1975, abandoned. This application Jan. 17, 1977, Ser. No. 759,726
Claims priority, application Japan, Apr. 15, 1974, 49-40943
Int. Cl.[2] H04M *3/56*
U.S. Cl. 179—18 BC 3 Claims



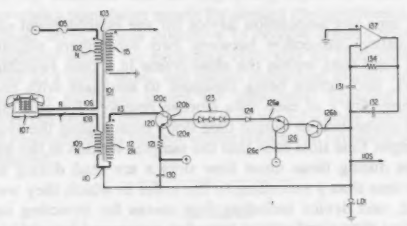
1. A trunk circuit for an exchange comprising:
a plurality of subscribers' telephones,
a plurality of internal office trunks for electrically connecting two subscribers' telephones with each other, each of the internal office trunks having first, second and third terminals,
a switching matrix circuit for electrically connecting the subscribers' telephones to the internal office trunks, the switching matrix circuit having a first plurality of terminals and a second plurality of terminals,
a switching circuit for electrically mutually connecting a desired number of the third terminals of the plurality of internal office trunks, the switching circuit having a plurality of terminals,
a central controller for controlling internal connections of the switching matrix circuit, in the plurality of internal office trunks and in the switching circuit,
means connecting the subscribers' telephones to the first plurality of terminals of the switching matrix circuit,
means connecting the second plurality of terminals of the switching matrix circuit to the first and second terminals of the plurality of internal office trunks,
means connecting the third terminals of the plurality of internal office trunks to the plurality of terminals of the switching circuit,
means connecting the central controller to the switching matrix circuit, and
means connecting the central controller to the switching circuit,
each internal office trunk comprising:
a first transistor,
a second transistor,
a third transistor,
a first diode,
a second diode,
a first resistor,
a second resistor,
a third resistor,
means connecting the first terminal of the internal office trunk to the collector of the first transistor,
means connecting the second terminal of the internal office trunk to the collector of the second transistor,
means connecting the first resistor between ground and the emitter of the first transistor,
means connecting the second resistor between ground and the emitter of the second transistor,
means connecting the collector of the first transistor to the anode of the first diode,
means connecting the collector of the second transistor to the anode of the second diode,
means connecting the cathode of the first diode and the cathode of the second diode to the third terminal of the internal office trunk,
means connecting the third resistor between the third terminal of the internal office trunk and the collector of the third transistor,
means connecting the emitter of the third transistor to ground,
means connecting the base of the first transistor to the central controller,
means connecting the base of the second transistor to the central controller, and
means connecting the base of the third transistor to the central controller.

4,046,967

LINE CIRCUIT USING MINIATURE LINE TRANSFORMER

John Francis O'Neill, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 5, 1976, Ser. No. 711,809
Int. Cl.[2] H04Q *1/28*
U.S. Cl. 179—18 FA 8 Claims



1. A line circuit for the tip and ring conductors of a telephone line comprising:
a transformer having tip, ring and balancing windings, said balancing winding being poled in opposite sense to that of said tip, ring and balancing windings, said current source means having a high AC impedance; and
a capacitor in circuit with said current source means and said balancing winding, said capacitor exhibiting a low AC impedance to current in said tip and ring windings.

4,046,968

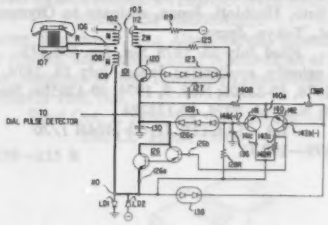
INTEGRABLE LINE CIRCUIT FOR USE WITH MINIATURE LINE TRANSFORMER

Milton Luther Embree; David Clayton Goldthorp, both of Reading, Pa., and John Francis O'Neill, Boulder, Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 5, 1976, Ser. No. 711,810
Int. Cl.[2] H04Q *1/28*
U.S. Cl. 179—18 FA 8 Claims

1. A telephone line circuit comprising:
a transformer having tip, ring and balancing windings, said balancing winding being poled in opposite sense to said tip and ring windings;
first and second solid-state means electrically connected between said tip and ring windings and said balancing winding;

capacitor means in series with said first solid-state means and said balancing winding; and

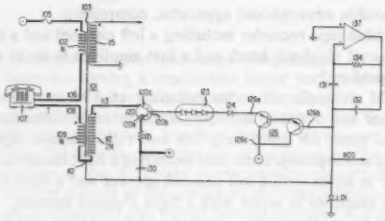


servo amplifier means for driving said second solid-state means substantially to suppress any variation in the AC potential of the junction of said second solid-state means with said tip and ring windings.

4,046,969
DIAL PULSE REPEATING LINE CIRCUIT USING MINIATURE LINE TRANSFORMER

James Edwin Dalley, Denver, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 5, 1976, Ser. No. 711,811
Int. Cl.[2] H04Q *1/28*
U.S. Cl. 179—18 FA 8 Claims



1. In a telephone line circuit having a transformer including a balancing winding serially connectable to the tip and ring windings and poled so as to counterbalance the DC magnetization thereof together with a capacitor joined to said windings for bypassing audio frequency current around said balancing winding, an arrangement for dynamically multiplying the apparent capacitance exhibited by said winding at audio frequencies except during dial pulsing, said arrangement comprising a capacitive voltage divider and an operational amplifier, the midpoint of said divider being connected to the point of junction of said bypass capacitor with said balancing winding and the ends of said divider being connected between an input and the output of said amplifier.

4,046,970
RINGING DETECTOR FOR TELEPHONE CIRCUITS

Cordell V. Castleman, Bloomington, Minn., assignor to Magnetic Controls Company, Minneapolis, Minn.

Filed Apr. 12, 1976, Ser. No. 675,949
Int. Cl.[2] H04M *1/26*
U.S. Cl. 179—84 L 3 Claims

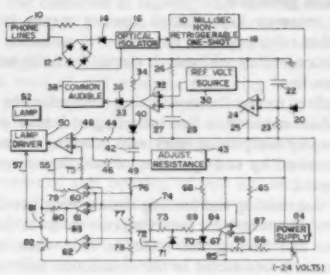
1. A ringing detector circuit for use in telephone systems comprising:

receiving means adapted to connect to the phone lines and operable to convert the alternating current ringing signal from the lines to a series of direct current pulses;

first charge storing means connected to receive the pulses from the receiving means and further connected to discharge through a predetermind resistance at a comparatively slow rate, so as to require a sufficiently high frequency of pulses in order to maintain a first selected voltage;

second charge storing means connected to a source of voltage so as to be charged thereby;

first switching means connected to said first and second storing means and operable to discharge the second charge storing means when in a first condition and to not discharge said second storing means when in a second



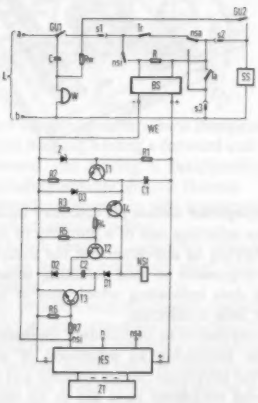
condition, said first switching means operable to switch from said first condition to said second condition in response to the reception of said first selected voltage stored by said first storing means; and

second switching means connected to said second storing means and to an indicating means, the second switching means operable to activate the indicating means in response to the reception of a second selected voltage stored in said second storing means.

4,046,971
SWITCHING ARRANGEMENT FOR TELEPHONE SUBSETS USING IMPULSE-TYPE PUSHBUTTON CALLING

Helmut Loschand, Dachau, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 24, 1976, Ser. No. 689,043
Claims priority, application Germany, May 23, 1975, 2522957
Int. Cl.[2] H04M *1/44*
U.S. Cl. 179—90 K 3 Claims



1. In a switching arrangement for a telecommunications set having a keyboard-actuated, replaceably connected selection unit, said selection unit having a pulse generator for producing pulse trains of differing characteristics in dependence on which of the keys is actuated, two relays in said selection unit, one of which controlled by said pulse generator serves for pulsing and

the other, a bistable relay, is connected to disable the speech circuit of the subset during the duration of the pulse train from the pulse generator and the selection unit further including transmitting and feeding circuit means connected to the connection line to the subset upon actuation of one of the keys in the keyboard, the improvement comprising:

said one of said relays being a monostable pulsing relay in said selection unit operable responsive to actuation of said pulse generator.

first common key-actuated contact means including said other relay operable responsive to actuation of a key for disconnecting said speech circuit from the subset connection line,

coupling means for connecting said selection unit to the subset connection line including at least a contact operated by said pulsing relay, said coupling means being short circuited by non-operation of said first common contact means,

said transmitting and feeding circuit being connected to said coupling means for receiving current from the connection line and feeding said selection unit when said coupling means is connected to the connection line, said transmitting and feeding circuit including a current supply means comprising first capacitance means, charged from current received through said coupling means for functioning as a voltage doubler and supplying actuating pulses to said pulsing relay and second capacitance to said selection unit and a holding current to said pulsing relay.

4,046,972

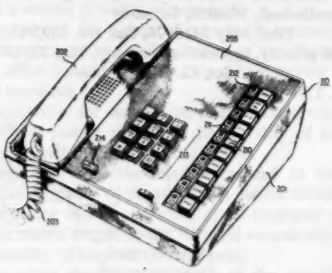
KEY TELEPHONE STATION SET CIRCUIT

Donald Dean Huizinga, Indianapolis; Edward William Underhill, Knightstown, and James Arthur Whitcomb, Indianapolis, all of Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 27, 1976, Ser. No. 735,991

Int. Cl.² H04Q 5/18

U.S. Cl. 179—99 **16 Claims**



1. Key telephone station set circuitry including:

means for selecting one of a plurality of apparent telephone lines having an appearance at the station set;

means, responsive to said selecting means, for producing digital data indicating which one of said apparent telephone lines is selected;

means, responsive to digital data transmitted to said station set, for producing an indication of which one of said apparent telephone lines is selected and which ones of said apparent telephone lines are in an operational mode at other station sets having in common said plurality of apparent lines;

means for generating an alerting signal; and

means, further responsive to said digital data transmitted to said station set, for controlling a volume and a frequency of oscillation of said alerting signal indicating an incoming call to said station set.

4,046,973

COMBINED PORTABLE TAPE RECORDER AND STEREOPHONIC RECEIVER SYSTEM

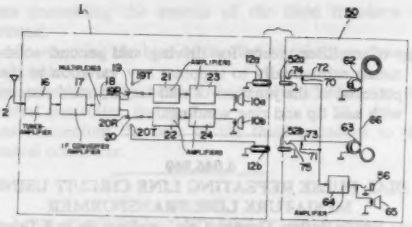
Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed July 15, 1975, Ser. No. 596,172

Claims priority, application Japan, July 18, 1974, 49-81663; July 22, 1974, 49-83906; Nov. 9, 1974, 49-129184; Nov. 9, 1974, 49-129185; Nov. 14, 1974, 49-131284

Int. Cl.² G11B 31/00; H04B 1/20

U.S. Cl. 179—100.11 **3 Claims**



1. Portable stereophonic apparatus, comprising:

a portable tape recorder including a left channel and a right channel playback head; and a first amplifier in series with a speaker;

an FM stereophonic radio including an FM stereophonic tuner and a stereo multiplexer electrically connected to said tuner for generating left and right channel signals, said stereophonic radio also including a left channel amplifier in series with a left channel speaker and a right channel amplifier in series with a right channel speaker;

means for mechanically coupling and decoupling said portable tape recorder to said radio such that said tape recorder and radio may be decoupled to form two independent units or coupled to form a single integrated unit;

first and second electrical connector means associated with said stereophonic radio;

third and fourth electrical connector means associated with said portable tape recorder, said first and third electrical connector means adapted to be electrically connected and said second and fourth electrical connector means adapted to be electrically connected when said tape recorder and radio are coupled to form a single integrated unit;

first switch means for connecting the outputs of both said left channel and said right channel playback heads to said first amplifier when said tape recorder and radio are decoupled whereby said tape recorder operates as a monaural recorder, said first switch means also for connecting said left channel and said right channel playback heads to said third and fourth electrical connector means, respectively, when said tape recorder and radio are coupled to form a single integrated unit;

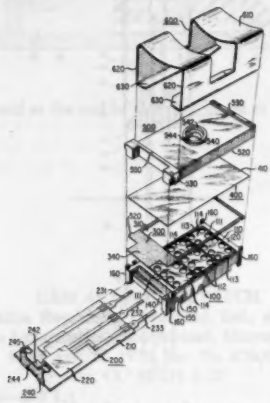
second switch means for connecting said left and right channel signals to said left and right channel amplifiers, respectively, when said second switch means is in a first position and for connecting said first and second electrical connector means to said left channel and right channel amplifiers, respectively, when said second switch means is in a second position such that said tape recorder operates as a stereophonic tape recorder when said tape recorder and radio are coupled to form a single integrated unit and said second switch means is in said second position.

4,046,974

ELECTROACOUSTIC TRANSDUCER WITH SPRINGS FORMING ELECTRICAL INTERCONNECTIONS AS A RESULT OF ASSEMBLY

John Charles Baumhauer, Jr.; Alex Michael Brzezinski; Joe Edward Warren, and Stephen Reed Whitesell, all of Indianapolis, Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 1, 1976, Ser. No. 728,604
Int. Cl.[2] H04R *19/00*
U.S. Cl. 179—111 R 12 Claims



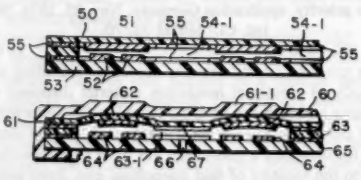
1. An electroacoustic transducer comprising:
a backplate having a conductive upper surface electrically interconnected with a contact surface thereof;
a circuit-bearing member positioned beneath the backplate, the circuit-bearing member having a contact spring mounted thereon, the contact spring engaging the contact surface of the backplate to electrically connect the conductive surface to the circuit on the circuit-bearing member and support the circuit-bearing member in place;
a diaphragm juxtaposed with the conductive upper surface of the backplate, the diaphragm having a conductive surface on the side opposite to that facing the backplate;
a conductive intermediate member positioned in engagement with the conductive surface of the diaphragm; and
a conductive spring member biasing the intermediate member toward the backplate, the spring member providing a conductive path between the conductive intermediate member and the circuit on the circuit-bearing member, and further support for the circuit-bearing member.

4,046,975

KEYBOARD SWITCH ASSEMBLY HAVING INTERNAL GAS PASSAGES PREFORMED IN SPACER MEMBER

Richard E. Seeger, Jr., Topsfield, Mass., assignor to Chomerics, Inc., Woburn, Mass.

Filed Sept. 22, 1975, Ser. No. 615,230
Int. Cl.[2] H01H *13/04*
U.S. Cl. 200—5 A 9 Claims



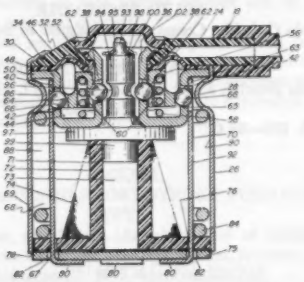
1. A keyboard sandwich comprising a bottom layer of insulator plastic, electrically conductive contacts supported on one side of said bottom layer, an insulator spacer layer positioned against said bottom layer side supporting said contacts, said spacer having a plurality of sets of openings therethrough from the top to the bottom surface thereof, each opening in register with at least one different contact and at least extending about substantially said entire contact in register therewith, a top layer of resilient and flexible plastic positioned against said spacer layer, said top layer supporting a plurality of contactors, at least one contactor in register with each of said openings, and a plurality of passages in said spacer layer which are substantially narrower in width than said openings and extending therethrough from the top to the bottom surface thereof, and different ones of said passages extending between each different set of said openings, said spacer top and bottom surfaces sealed to said top and bottom layers about said openings and said passages, whereby upon depression of a contactor into one of said openings of a set, gas trapped in said opening will move into others of said opening of said set, said top layer includes a plurality of protrusions in register with a different one of said openings, each protrusion supporting at least one different contactor on the underside thereof and in which a vent hole extends through at least said top or bottom layers and opens into one of the narrow passages.

4,046,976

PRESSURE ACTUATED SENSOR SWITCH WITH BOBBIN, TRIP CORD AND BREAKWIRE

Jerome J. Price, Bloomington; Carl G. Karsten, Crystal, and William D. Paggen, Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 16, 1976, Ser. No. 649,626
Int. Cl.[2] H01H *3/02*
U.S. Cl. 200—61.93 3 Claims



1. A gas pressure actuated sensor which comprises:
a tubularly shaped housing having a forward end and a rear end, said forward end having a peripherally disposed inwardly protruding annular groove therein;
bobbin means biasedly disposed in said housing for deploying a personnel actuated trip line;
breakwire-disturbance sensitive means for detecting movement of said trip line by personnel after deployment of said bobbin means;
a release-lock gas pressure sensitive means operatively positioned in said housing intermediate the forward end of said housing and said inwardly protruding annular groove, for releasing said bobbin means upon an increase of gas pressure, for locking said breakwire means during a first interval of time and releasing said breakwire means after said first interval of time so that said breakwire is responsive to movement of said trip line, which includes;
a cup shaped member having an integral tubular section which has a plurality of peripherally disposed inner detent holes, a flange exterior wall having a plurality of peripherally disposed outer detent holes, and an annular sliding groove disposed intermediate the interior wall

surface of said flanged exterior wall and the exterior wall surface of said tubular section;

a cover plate disposed in said housing having a gas inlet port integral therewith;

a ring camming member slidably and biasedly positioned in said cup member annular sliding groove, said ring member having an inner annular camming surface, an outer annular camming surface thereon and a spring groove on one end;

a circularly shaped diaphragm disposed intermediate said cover plate and said cup shaped member, said diaphragm operatively moving said ring camming member in response to gas being introduced into said inlet port;

a helical release ring spring biasedly positioned intermediate said ring camming member and said cup shaped member;

a plurality of inner detent balls disposed in said inner detent holes of said cup shaped member tubular section adjacent said inner annular camming surface of said ring camming member;

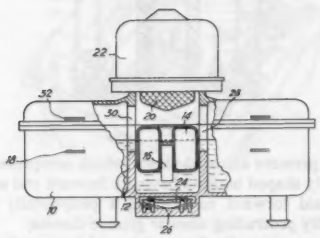
a plurality of outer detent balls disposed in the outer detent holes of said cup shaped member tubular section intermediate said outer camming surface of said ring member and said housing.

4,046,977

FLUID RESERVOIR

Leonardo Cadeddu, Crema, Italy, assignor to Benditalia S.p.A., Italy

Filed July 31, 1975, Ser. No. 600,710
Claims priority, application Italy, Aug. 22, 1974, 26501/74
Int. Cl.² H01H *35/40*
U.S. Cl. 200—84 C 2 Claims



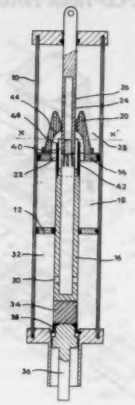
1. A fluid reservoir made of non-magnetic material comprising two chambers communicating with a common well, a single reservoir refill aperture located between the two chambers and above said well and communicating with said well, a float disposed in said well and bearing a permanent magnet and a switch outside said reservoir under the bottom of the well, said switch being actuated by the magnet when the float is at a predetermined level in the well, said well communicating with the two chambers through vertical narrow slots, the location of the lower ends of said slots being such that a predetermined quantity of fluid is retained in one chamber in case of fluid depletion of the other chamber, the upper ends of said slots being above the maximum fluid level admissible in the reservoir to permit fluid refilling of the chambers from said well via the single reservoir refill aperture up to said maximum fluid level.

4,046,978

CONTACT STRUCTURE FOR PUFFER-TYPE GAS-BLAST CIRCUIT INTERRUPTER

Aimé Badon, Montbonnot-St. Martin, France, assignor to Merlin Gerin, Grenoble, France

Filed Feb. 13, 1976, Ser. No. 658,033
Claims priority, application France, Feb. 26, 1975, 75.06075
Int. Cl.² H01H *33/70*
U.S. Cl. 200—148 A 1 Claim



1. A contact structure for a circuit interrupter comprising a pair of elongated aligned contact members axially separable to draw an arc between the confronting end portions of said contact members, and a puffer mechanism to produce a blast of compressed gas directed towards said arc, one of said contact members being tubular and having the end portion thereof provided with a plurality of generally axially extending circumferentiallyspaced-apart resilient contact fingers adapted to telescopically receive the confronting end portion of the other contact member in gripping contact relation therewith, said contact fingers being surrounded by a cylindrical sleeve ending short of the tips of said fingers thereby permitting to direct a cross-blast of gas through the interstices between said tips to exhaust through the venting interior of said tubular contact member, said sleeve screening off the residual length portion of said fingers preventing the radial flow of fresh gas between the corresponding part of said fingers during the separation movement of said contact members.

4,046,979

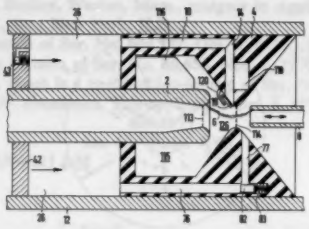
ARC QUENCHING ARRANGEMENT FOR A GAS-FLOW TYPE CIRCUIT BREAKER

Walter Hertz; Jan Stroh, and Jürgen Mentel, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 18, 1975, Ser. No. 632,991
Claims priority, application Germany, Nov. 25, 1974, 2455674
Int. Cl.² H01H *33/70*
U.S. Cl. 200—148 A 11 Claims

1. In a gas-flow circuit breaker apparatus including a housing, a body of electrical insulation material disposed within said housing and forming an arc quenching gap therewithin, at least one gas flow canal disposed within said body of insulation material for directing a quenching gas from a space within said housing to the vicinity of said quenching gap, fixed and movable electrical contacts disposed within said housing adjacent said quenching gap, and a check valve disposed in said flow canal for permitting the flow of said gas only from said gap, the

improvement comprising said flow canal extending to and opening adjacent said quenching gap, and said check valve



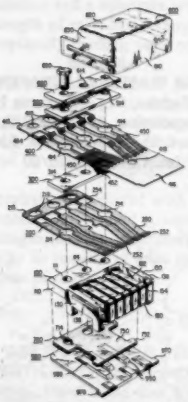
being disposed at the end of said flow canal at said quenching gap.

4,046,980

CAM ACTUATED SWITCH

Frederick Allen Rosebrock, Greenfield, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 20, 1976, Ser. No. 678,690
Int. Cl.[2] H01H *3/00*
U.S. Cl. 200—153 LA **14 Claims**



1. A switch comprising:

a pair of cantilever contact springs, the fixed ends of the contact springs being electrically insulated from one another and the free end portions of the contact springs extending into juxtaposition with one another and having contact surfaces for engaging one another;

a unitary support member including:

1. integral base means to which the fixed ends of the contact springs are secured,
2. integral guide means defining a channel, and
3. integrally hinged cam follower means extending between the free end portion of a first of the contact springs and the channel, the support member being electrically insulated from the contact springs; and

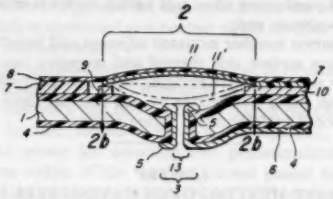
an actuator positioned within the displaceable along the channel, the actuator including cam portions for engaging the cam follower means and deflecting them so as to displace the first contact spring to effect operation of the switch.

4,046,981

KEYBOARD SWITCH WITH PRINTED WIRING BOARD STRUCTURE AND ITS METHOD OF MANUFACTURE

Dudley Bruce Johnson, Irving, and Stephen Leroy Hanni, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 24, 1975, Ser. No. 644,206
Int. Cl.[2] H01H *13/70, 9/00*
U.S. Cl. 200—159 B **19 Claims**



1. A momentary contact switch comprising:

a. a metallic sheet substrate having at least one major surface of insulating material and having at least one indentation on said major surface;

b. at least one first contact disposed on said major surface in the region of said at least one indentation;

c. a second contact affixed to said substrate, being disposed in spaced relation to said at least one first contact, and having a top surface of said second contact located above a top surface of said at least one first contact; and

d. an actuating element having at least one surface of conductive material, mounted on said second contact and being disposed over at least part of said indentation, the conductive surface of said actuating element being electrically connected to said second contact and in spaced relation to said first contact;

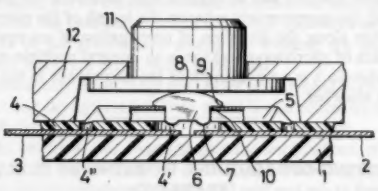
e. said first and second contacts being electrically connectable by the conductive surface of said actuating element to provide an electrically conductive path between said first and said second contacts in response to depression of said actuating element into said indentation.

4,046,982

SWITCH MEANS FOR SHORT-STROKE PUSH-BUTTON KEYS

Rudolf Schadow, and Dieter Michalski, both of Berlin, Germany, assignors to Rudolf Schadow, GmbH, Germany

Filed June 30, 1975, Ser. No. 591,746
Int. Cl.[2] H01H *3/12*
U.S. Cl. 200—159 R **5 Claims**



1. A snap-action, two-position, push-button switch device for bridging adjacent ends of conductors which are disposed on a common surface side of a printed circuit board of insulating material, thereby to complete a switch circuit when said switch device is in one of its two positions, said switch device comprising, in combination:

a spring element engaging a portion of said board and formed from a generally flat metallic spring material

which is bent at a central portion thereof to provide a resiliently deformable arch-like portion which is normally spaced-apart from said adjacent ends of said conductors corresponding to a first of said two positions, but which is deformable toward said adjacent ends corresponding to the second of said two positions, and which snaps back to its initial arch-like configuration upon the removal of an external deforming force;

a conductive bridging element carried by said spring element and which conductively engages said adjacent ends of said conductors when said switch device is in one of its two positions; and,

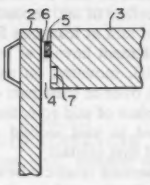
a push-button member mounted adjacent said board on said common surface side thereof and engaging one of said spring and conductive bridging elements, said push-button member being translatable by said external force toward said board to deform said spring element.

4,046,983

MICROWAVE HEATING OVEN HAVING SEAL MEANS FOR PREVENTING THE LEAKAGE OF MICROWAVE ENERGY

Ken Ishino, Nagareyama; Yasuo Hashimoto, and Hiroaki Abe, both of Ichikawa, all of Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed June 14, 1976, Ser. No. 695,436
Claims priority, application Japan, Sept. 3, 1975, 50-106824
Int. Cl.[2] H05B *9/06*
U.S. Cl. 219—10.55 D 7 Claims



1. In a microwave heating oven comprising a body formed by walls and having an opening in one of said walls; a door provided for closing said opening; said body and said door in a closed position defining a path through which microwave energy may leak from the inside to the outside of said oven; and leakage prevention means comprising a layer of microwave absorber located directly along one surface defining said path, the layer of microwave absorber incompletely blocking the opening of said path and having a surface exposed to said path, whereby said surface of said microwave absorber and opposed surface of said path form a gap therebetween, said microwave absorber consisting of a mixture of the powder of magnetic material and an organic high molecular weight compound, the improvement wherein the length of the microwave absorber along the direction of propagation of microwave in the path of microwave leakage is an integral multiple of about $\frac{1}{4}\lambda$, wherein λ is a wavelength of the microwave in the microwave absorber.

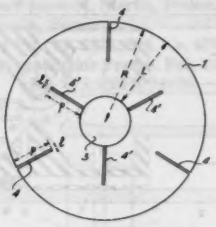
4,046,984

CUTTING-OFF MACHINE WORKING BY ELECTRIC SPARKING

Guy Aimé Vial, Pont de Claix, France, assignor to Vial S.A.R.L., Eybens, France

Filed Dec. 29, 1975, Ser. No. 645,304
Claims priority, application France, Jan. 17, 1975, 75.01376
Int. Cl.[2] B23P *1/08*
U.S. Cl. 219—69 E 15 Claims

1. In a device for cutting material by means of electric sparks, said device comprising a disc of electrically conductive material through which a dielectric liquid circulates, means supporting said disc for rotary motion, and means for providing an electrical current between the periphery of said disc and said material, the improvement according to which said disc is formed with a group of circumferentially spaced radial slots



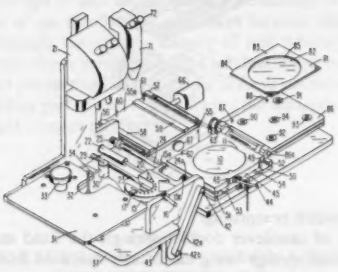
therein which inhibit deformation of said disc by said current, said slots having a length equal to at least L/2, where L= the radial distance between the periphery of said disc and said supporting means.

4,046,985

SEMICONDUCTOR WAFER ALIGNMENT APPARATUS

Gerald Alan Gates, Jericho, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,989
Int. Cl.[2] B23K *26/00*
U.S. Cl. 219—121 L 10 Claims



3. An apparatus for dicing a semiconductor wafer, opaque to visible light, having first and second major surfaces and first and second reference marks on said first surface thereof comprising,

optical means for viewing said marks with visible light reflecting from said first surface,

means for aligning said marks with a reference position,

dicing means contacting said second surface,

means for establishing said dicing means in a known relationship with respect to said optical means and said reference position, and

means for traversing said dicing means across said second surface of said wafer to dice said wafer into individual units.

4,046,986

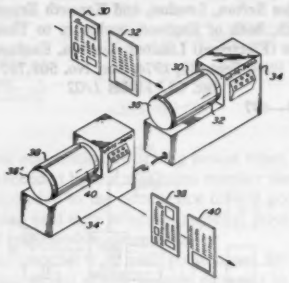
APPARATUS FOR MAKING PRINTING PLATES AND OTHER MATERIALS HAVING A SURFACE IN RELIEF

Ronald C. Barker, Weston, Mass., assignor to Applied Display Services, Inc., New York, N.Y.

Continuation of Ser. No. 404,532, Oct. 9, 1973, abandoned, which is a division of Ser. No. 86,656, Nov. 4, 1970, Pat. No. 3,832,948, which is a continuation-in-part of Ser. No. 883,525, Dec. 9, 1969, abandoned. This application Oct. 8, 1975, Ser. No. 620,897

Int. Cl.² B23K 9/00

U.S. Cl. 219—121 LM 9 Claims



1. Apparatus for forming a surface in relief in a composite plate of the type having a layer of material which is absorptive of a first wavelength of radiation but reflective of a second wavelength of radiation and a substrate which is absorptive of the second wavelength of radiation, comprising:

first means for optically reading page composition information,

second means operatively associated with said first means for selectively generating a first coherent radiation at said first wavelength, said first wavelength radiation having sufficient energy to remove selected portions of said layer of material and to expose corresponding portions of said substrate.

third means operatively associated with said first means for selectively generating a second coherent radiation at said second wavelength, said second coherent radiation having sufficient energy to remove at least partially each of said exposed portions of said substrate.

4,046,987

DC ARC WELDING APPARATUS USING HIGH-FREQUENCY PULSE CURRENT

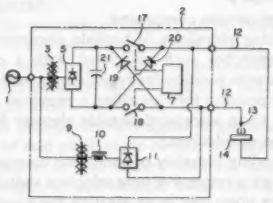
Shinichiro Hashimoto; Toru Goto, and Yukio Kajino, all of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1976, Ser. No. 662,876

Claims priority, application Japan, Mar. 10, 1975, 50-28788

Int. Cl.² B23K 9/10

U.S. Cl. 219—135 8 Claims



1. A DC arc welding apparatus using a high-frequency pulse current comprising:

a rectifier bridge for commutating AC voltage and for applying DC voltage having a substantially smooth waveform to a circuit comprising an electrode and a workpiece for welding,

a first switch connected between one side of an arc load formed between the electrode and the workpiece and a positive output side of the rectifier bridge,

a second switch connected between the other side of the arc load and a negative output side of the rectifier bridge,

a capacitor one end of which is connected to a contact of the rectifier bridge and the first switch and the other end of which is connected to a contact of the rectifier bridge and the second switch,

first and second rectifiers connected so as to charge energy accumulated in the inductance of the circuit comprising the electrode and the workpiece during the OFF state of the first and second switches to the capacitor, and

control means for detecting two predetermined instantaneous values of the welding current passed through the arc load and for providing ON and OFF commands to one of the switches to reciprocate the welding current for plural times in a range between the two instantaneous values during the ON state of the other switch.

4,046,988

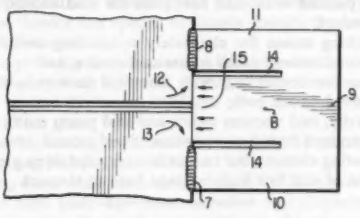
METHOD OF PREVENTING BASE METAL END CRACK IN ARC WELDING AND END TAB USED THEREFOR

Naoki Okuda, Fujisawa, and Kazuo Tanaka, Yokosuka, both of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Mar. 5, 1976, Ser. No. 664,272

Int. Cl.² B23K 9/32

U.S. Cl. 219—137 R 5 Claims



1. A method of preventing base metal end cracks in arc welding using an end tab having two slits defined within one lateral side portion thereof so as to in turn define three uniplanar, cantilevered protuberant portions within said one side thereof, comprising the steps of:

positioning the two end protuberant portions of said end tab against the base metal in end abutment therewith on both sides of the groove line where the welding arc and the weld metal are not directly contacted;

simultaneously positioning the center protuberant portion of said end tab against said base metal in end abutment therewith on an extension of said groove line thereof;

fixedly securing said two end protuberant portions of said end tab to the welding end of said base metal while leaving said center protuberant portion of said end tab in free end abutment with said base metal; and

carrying out a welding operation on said base metal with said end tab secured thereto as characterized herein,

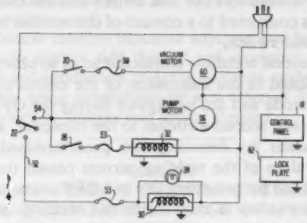
the three protuberant portions being so dimensioned such that said deformation and expansion of said base metal is properly controlled as a result of the relative disposition of said base metal and said end tab, and the controlled expansion of said center end tab portion as permitted by said slits defined between said center and end portions of said end tab.

4,046,989

HOT WATER EXTRACTION UNIT HAVING ELECTRICAL IMMERSION HEATER

Carl Parise; Ralph Eugene Blackman, both of Reno, and James M. Wimsatt, Carson City, all of Nev., assignors to Parise & Sons, Inc., Reno, Nev.

Filed June 21, 1976, Ser. No. 698,252
Int. Cl.[2] F27D *11/02*
U.S. Cl. 219—437 **2 Claims**



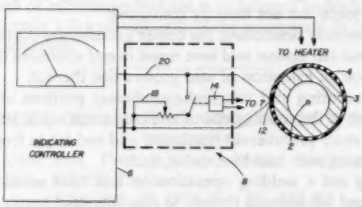
1. In a hot-water extraction unit comprising:
a solution tank,
an electrical vacuum motor,
an electrical pump motor,
an electrical immersion heater, said heater being mounted within said tank, said immersion heater comprising a first high wattage heating element and a second low wattage heating element,
circuit means for selectively connecting said heater elements and said motors across a source of electrical power, said circuit means comprising means defining a first circuit path for said first heater element and a second circuit path in parallel with said first path for said second heating element,
switching means for alternately connecting said first and second current paths across said source, and
means for connecting both electrical motors within said second circuit path;
whereby, said vacuum motor and said pump motor may be energized during energization of said second, low wattage heating element, but cannot be energized during energization of said first high wattage heating element.

4,046,990

TEMPERATURE SENSING AND CONTROL OF A FUSING ROLL

William E. White, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,993
Int. Cl.[2] H05B *1/02*
U.S. Cl. 219—471 **5 Claims**



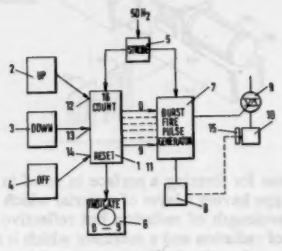
5. In an electrographic device including a fusing roller of the type including (1) a heat conductive inner core having a heat insulative outer release coating which includes an outer fusing surface, and (2) controllable heat source means for heating the inner core of the roller and thereby heating the outer fusing surface, improved apparatus for maintaining said fusing surface at a desired fusing temperature, said apparatus comprising:
a. means for directly sensing the temperature of said inner core; and
b. temperature control means, responsive to said sensing means and associated with said heat source means to maintain said inner core at a predetermined core temperature above the desired temperature of said fusing surface to provide proper heat flow through said heat insulative outer release coating to compensate for heat loss occurring at the outer fusing surface, whereby said fusing surface is maintained at the desired temperature.

4,046,991

POWER CONTROL APPARATUS

Philip Charles Sefton, London, and Kenneth Ernest Chad, Bushey Heath, both of England, assignors to Thorn Domestic Appliances (Electrical) Limited, London, England

Filed Sept. 27, 1974, Ser. No. 509,787
Int. Cl.[2] H05B *1/02*
U.S. Cl. 219—497 **15 Claims**



1. In an electric cooker, a power control apparatus including; a memory for storing a variable numerical value, the memory having an output, a first control input for causing the values stored in the memory to be increased progressively while such first control input is actuated, and a second control input for causing the value stored in the memory to be decreased progressively while such second control input is actuated; first and second manually operable means for actuating said first and second control inputs respectively; an electric cooker heating element; and means connected to the output of the memory for varying the current supplied to the heating element in dependence on the value stored in the memory, so that each value corresponds to a particular rate of current supply to the load.

4,046,992

COMPACT ELECTRONIC VOTING

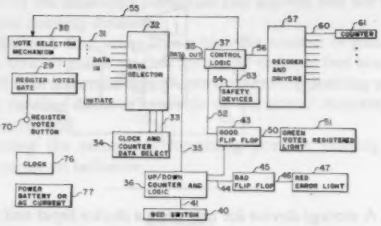
Mary Susan Huhn, 38 Ridgewood Ave., Groton, Mass. 01450; Paul Horowitz, 19 Fair Oaks Drive, Lexington, Mass. 02173, and Winfield Hill, 165 Hunnewell Ave., Newton, Mass. 02158

Filed Mar. 4, 1976, Ser. No. 663,839
Int. Cl.[2] G07C *13/00*
U.S. Cl. 235—54 F **8 Claims**

1. Voting apparatus comprising,
corresponding pluralities of bistable elements and vote selecting switches each associated with a candidate and having a vote position for registering a vote selection and an erase position for cancelling a previous vote selection coupled to an associated bistable element for storing the condition of selection,
a corresponding plurality of candidate counter means associated with a respective vote selection switch for accumulating the votes cast in an election for a particular candidate associated therewith,
vote registration switching means for actuation by a voter to cause the votes then selected by the voter for transfer to said candidate counter means,

means for storing a number corresponding to the maximum number of votes a voter may cast in a particular election,

means for sequentially scanning said bistable elements to provide a sequence of signals representative of the number of votes then cast by a voter and for effectively comparing the latter number with the number stored in said means for storing to provide a good signal in response to actuation of



said vote registration switching means when that number is not exceeded by the maximum number there stored,

means responsive to the occurrence of said good signal for preventing said vote selection switches from altering the state of said bistable elements,

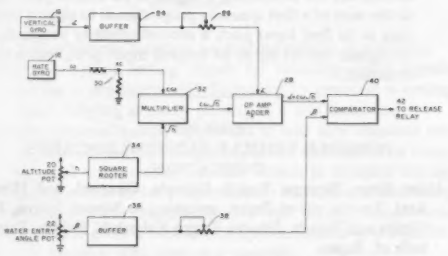
and means responsive to said good signal for transferring votes then stored in said bistable elements to corresponding ones of said output counter means.

4,046,993

TARGET FOR TORPEDO LAUNCH SYSTEM

Charles A. Wilson, Oxnard, and Patrick J. Moran, Ventura, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 28, 1976, Ser. No. 700,655
Int. Cl.² G06G 7/80
U.S. Cl. 235—61.5 D **8 Claims**



1. A system for launching an object from an aircraft over a relatively flat surface area such that said object impacts said surface area at a predetermined angle comprising:

a. means for producing a signal representative of pitch angle of said aircraft;

b. means for producing a signal proportional to angular velocity of said pitch angle of said aircraft;

c. means for producing a signal representative of the square root of a preselected launch height of said aircraft over said surface area;

d. means for multiplying said signal proportional to angular velocity of said pitch angle of said aircraft by said signal representative of the square root of said preselected launch height of said aircraft over said surface area to produce a time angle rotation signal;

e. means for adding said time angle rotation signal to said signal representative of pitch angle of said aircraft to produce a signal which is continuously representative of predicted object impact attitude with said surface area;

f. means for producing a signal representative of said predetermined angle; and

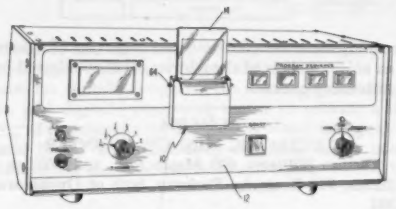
g. means for comparing said signal representative of predicted object impact attitude with said signal representative of said predetermined angle to produce an object release signal whenever said signal representative of predicted object impact attitude exceeds said signal representative of said predetermined angle.

4,046,994

CONTROL CARD RECEIVING AND SENSING ASSEMBLY

Raymond James Prohaska, Glen Cove, N.Y., assignor to Unit Process Assemblies, Inc., Syosset, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,376
Int. Cl.² G06K 7/06; H01H 43/08
U.S. Cl. 235—61.11 A **10 Claims**



1. A card reader assembly for control cards having a metallic contact electrode pattern thereon and the like comprising

a fixed rectangularly shaped base plate,

a generally U-shaped displaceable cover member having a rectangular base portion and a pair of side wall portions perpendicularly extending in parallel relation from one face thereof and spaced to closely contain the base plate therebetween,

means pivotally interconnecting the dependent end of said base plate with side wall portions of said cover member for pivotal displacement of said cover member relative to said base plate,

means for biasing said base plate and cover member into abutting interfacial relation,

sensing electrode elements mounted on the facing surfaces of said base plate and cover member and displaceable in conjunction therewith and selectively shaped card entry slot defining means disposed on the upper end of said cover member and said rectangularly shaped base plate contoured to permit card entry intermediate said card sensing electrode elements only when the latter are spaced apart a distance that permits card insertion therebetween without pressure contact on the electrode pattern surfaces thereof.

4,046,995

MEMORY FULLNESS INDICATOR

Ernest J. Salley, Phoenix, Ariz., assignor to Engineered Systems, Inc., Phoenix, Ariz.

Filed Nov. 17, 1975, Ser. No. 632,263
Int. Cl.² G06K 15/18; G11C 11/00
U.S. Cl. 235—61.6 R **12 Claims**

8. A system for indicating the degree of fullness of an electronic memory including in combination:

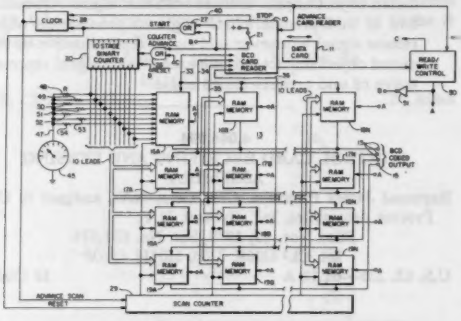
an electronic memory with a predetermined number of address locations for storing unique digital data at each such address location;

a plurality of address leads coupled with corresponding address inputs to said electronic memory;

addressing means coupled with said address leads for supplying binary encoded address signals to said memory to sequentially select individual addresses therein;

digital-to-analog converter means coupled with said address

leads for supplying a signal to an output lead therefrom; and



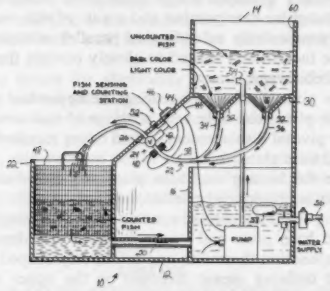
an analog meter coupled with said output lead for providing an analog indicia of the address location selected by said addressing means.

4,046,996

ELECTRONIC MINNOW COUNTER

Larry Thomas Williams, 603 Maple Ave., and William Jerry Williams, 921 Kentucky Parkway, both of Owensboro, Ky. 42301

Filed Nov. 17, 1976, Ser. No. 742,915
Int. Cl.² B65G *51/36*; G06M *3/02*
U.S. Cl. 235—92 PK **4 Claims**



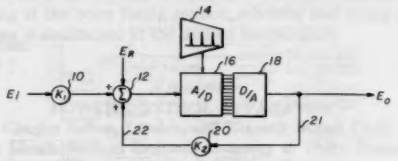
1. A device for counting live minnows comprising:
a tank for holding water containing a plurality of live minnows which are to be counted;
a conduit connected to the tank to serve as a drain therefor;
a valve interposed in said conduit and shiftable between an open condition which permits water and live minnows to drain through the conduit from the tank, and a closed condition which impounds the water and live minnows in the tank and conduit upstream of the valve;
a minnow sensing and counting means addressing the conduit, for sensing and counting minnows passing through the conduit in the draining water, as they pass said minnow sensing and counting means;
a control device interconnecting the valve and the minnow sensing and counting means, for closing the valve when a preselected number of minnows has been sensed and counted by the minnow sensing and counting means; and
an improvement, wherein the conduit is connected to the tank by funnel means which presents a dark surface towards the minnows in the tank, and the remainder of the tank presenting a light surface towards the minnows, for using the natural habitat effect of minnows to draw them head first toward the funnel means.

4,046,997

DIGITAL-STORAGE FILTER

Paul Herbert Chase, East Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 4, 1976, Ser. No. 683,442
Int. Cl.² G06J *1/00*
U.S. Cl. 235—150.5 **5 Claims**



1. A storage device for receiving a device input and processing it to produce a device output comprising:
a. a digital-to-analog converter, having an output port and a plurality of input terminals;
b. means, having an input port, for maintaining a digital representation of a signal occurring at its input port at the most recent of a series of periodically occurring discrete times as an input to the terminals of the digital-to-analog converter, the signal at the output of the digital-to-analog converter thereby being equal to

$$K_3 e + E_A,$$

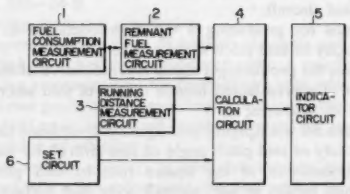
where K_3 is a first constant, e is the input, at the most recent of the discrete times, to the means for maintaining a digital representation, and E_A is a second constant; and
c. means having an output port and first and second input ports, the output port being connected to the input port of the means for maintaining a digital representation, the first port receiving the device input, and the second input port being connected to the output port of the digital-to-analog converter, for producing a signal at its output port equal to the sum of a first quantity proportional to signals occurring at its first input port, a second quantity proportional to signals occurring at its second input port, and a third constant.

4,046,998

POSSIBLE VEHICLE RUNNING DISTANCE INDICATION

Akira Kuno, Nagoya; Yoshio Shinoda, Okazaki, and Hiroshi Arai, Toyota, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Feb. 3, 1976, Ser. No. 654,963
Claims priority, application Japan, Feb. 11, 1975, 50-17178
Int. Cl.² G01M *13/26*
U.S. Cl. 235—150.21 **7 Claims**



1. A method of indicating a remaining possible vehicle running distance available on the remnant fuel of a vehicle comprising the steps of:

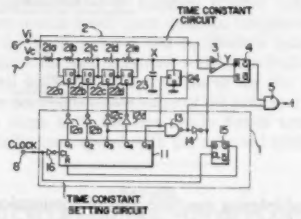
measuring the amount of fuel consumed;
measuring the remnant fuel amount in a fuel tank;
measuring the running distance the vehicle has run;
storing the measured remnant fuel amount when either one of the measured consumed fuel amount and the measured running distance has reached a predetermined value;
generating a train of pulses after said storing step, one cycle period of the train of pulses being determined by the other one of the measured consumed fuel amount and the measured running distance;
calculating a time interval in which the number of pulses in the train of pulses reaches the stored remnant fuel amount, said time interval being proportional to a remaining possible running distance available on the stored remnant fuel amount; and
indicating the calculated remaining possible running distance by an indicator.

4,046,999

LOGARITHMIC FUNCTION GENERATING SYSTEM

Ritsu Katsuoka, Okazaki; Hisasi Kawai, Toyohashi, and Seiji Morino, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 29, 1976, Ser. No. 681,744
Claims priority, application Japan, June 16, 1975, 50-72892
Int. Cl.² G06J 1/00; G06G 7/24
U.S. Cl. 235—150.53 **6 Claims**



1. A logarithmic function generating system comprising:
a time constant setting circuit for counting clock signals having a predetermined frequency to generate a setting signal varying at every passing of a unit time; and
a time constant circuit connected to said time constant setting circuit and including a capacitor, said capacitor being charged with a time constant which is constant during said unit time and is proportionally increased at said every successive unit time, whereby the voltage across said capacitor gives a broken line approximation to a logarithmic function with time as a variable.

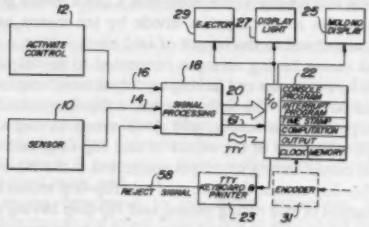
4,047,000

CONTROL SYSTEM FOR COMPUTER CONTROLLED IDENTIFICATION OF BOTTLES

Nelson H. Bryant, Ithaca; Ross L. Hobler, Elmira, both of N.Y.; Wilbur J. Allen, Millerton, Pa., and Joseph W. Poliseo, Elmira, N.Y., assignors to Powers Manufacturing, Inc., Elmira, N.Y.

Filed Dec. 2, 1975, Ser. No. 636,875
Int. Cl.² G01D 21/04
U.S. Cl. 235—151.1 **10 Claims**

1. A computer controlled system for identifying the mold source of a bottle provided with one or more sectors spanning a circumferential zone with prism-like timing marks thereon including a laser source for passing a laser beam through the sectors and a sensor for generating a series of digital pulses in response thereto, comprising:
means for generating a series of digital clock pulses independently of said sensor pulses;
means for time stamping said sensor pulses with said clock pulses and for storing the time stamp information;
means for digitally computing the pulses widths and interpulse spacings of said sensor pulses in terms of said time stamp information.
means for digitally comparing the spans of said sectors in



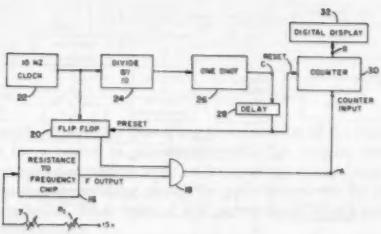
terms of said time stamp information to said interpulse spacings of said sensor pulses; and
means for digitally weighting the sensor pulses in response to said digitally comparing means to provide a digital signal representing the distribution of said timing marks on said bottle, said distribution of timing marks uniquely identifying the mold source of said bottle.

4,047,001

ENCODING ALTIMETER

Norman M. Witriol, 2501 Lancelot Drive SE., Huntsville, Ala. 35803, and Carlton L. Frederick, 518 Dryden Road, Ithaca, N.Y. 14850

Division of Ser. No. 533,576, Dec. 17, 1974, Pat. No. 3,961,272. This application Mar. 8, 1976, Ser. No. 664,592
Int. Cl.² G01V 1/28; G01L 7/20
U.S. Cl. 235—151.3 **2 Claims**



1. A system comprising: a signal whose amplitude is to be measured; first means having an input and an output, said signal being connected to the input of said first means, said first means having an output which has a frequency proportional to the amplitude of said signal; counting means for counting the number of cycles in a predetermined amount of time of the output of said first means, said counting means having an input, a reset input, and an output; gating means having two inputs and an output, the output of said first means being connected to one of the inputs of said gating means, and the output of said gating means being connected to the input of said counting means; timing means having first and second outputs, said first output being connected to the other input of said gating means for providing a voltage output over said predetermined amount of time in a cyclic manner over a second larger predetermined amount of time; said gating means passing the output of said first means to the input of said counting means when said timing means is producing a voltage output, and said gating means having no output when said timing means is not producing a voltage output; said timing means having a second output connected to the reset input of said counting means for

producing a voltage output at said second output just prior to the starting of the first predetermined amount of time to reset the count of said counting means; said timing means repeating its output functions in a predetermined number of clock cycles, said first output having a voltage thereon for a first clock cycle, and said second output having a voltage thereon for a second clock cycle just prior to said first clock cycle; and wherein said timing means comprises a clock means producing clock cycles at its output; a divide by ten means having an input connected to the output of said clock means; a one shot circuit means having an input connected to an output of said divide by ten means and having an output which represents the second output of the timing means; a flip-flop circuit having two inputs and an output; said clock means having an output connected to one of the inputs of said flip-flop; said one shot circuit means having its output connected to the other input of said flip-flop means; the output of said flip-flop means being the first output of said timing means; said flip-flop having a voltage output when said one shot means has a voltage output; said flip-flop having no output when said one shot does not have an output; and a digital display means being connected to said counting means so as to display the count of the counting means.

4,047,002

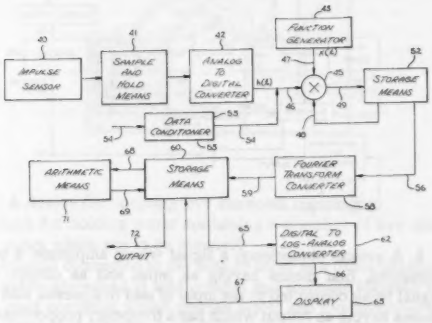
LAPLACE TRANSFORM SYSTEM

Edwin A. Sloane, Los Altos; Bruce T. McKeever, Mountain View, and Eugene Wong, Berkeley, all of Calif., assignors to Time/Data Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 552,655, Feb. 24, 1975, abandoned, which is a continuation of Ser. No. 389,510, Aug. 20, 1973, abandoned. This application June 28, 1976, Ser. No. 700,446

Int. Cl.² G01R *23/16, 27/02;* G06F *15/34*

U.S. Cl. 235—151.3 **33 Claims**



1. A system for determining the natural resonant frequencies associated with a specimen comprising:

sensor means for sensing the response of the specimen to a predetermined excitation;

converting means for converting the sensed response of said specimen to a frequency domain representation of said response coupled to said sensor means;

differentiation means for differentiating said frequency domain representation, coupled to said converting means; and

peak detection means for detecting the peaks of a signal coupled to said differentiation means;

whereby the interaction of the poles are minimized through said differentiation such that said resonant frequencies may be determined.

4,047,003

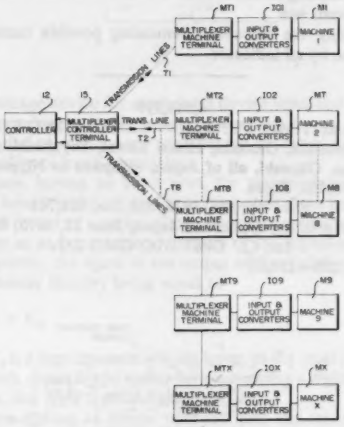
COMMUNICATION CONTROL SYSTEM

James J. LaRocca, La Grange, and Richard A. Mazur, Downers Grove, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 570,430, April 22, 1975, abandoned, and a continuation-in-part of Ser. No. 570,407, April 22, 1975, abandoned. This application Apr. 9, 1976, Ser. No. 675,608

Int. Cl.² G06F *15/46;* G08C *15/00*

U.S. Cl. 235—151.11 **27 Claims**



1. A multiplexing machine control communications system for controlling a plurality of machines from a programmable controller, comprising

a multiplexer controller terminal for receiving condition-defining information signals representing the operational functions of a plurality of independently operable multifunctioning machines and transmitting in response thereto predetermined condition-responsive command signals to control selected functions of each of said machines,

a programmable controller coupled to said multiplexer controller terminal to provide a source of said predetermined condition-responsive command signals for controlling said machine functions in response to said condition-defining information signals,

a multiplexer machine terminal coupled to each one of said plurality of independently operable multifunctioning machines to transmit condition-defining information signals responsive to the operational functions of a machine coupled thereto and to receive in response thereto selected ones of said predetermined condition-responsive command signals,

an input and output converter coupled between said multiplexer machine terminal and a machine coupled thereto for coupling said information and command signals therebetween,

respective transmission lines for connecting said multiplexer controller terminal in parallel with each of said multiplexer machine terminals, nd

said multiplexer controller terminal enabling communication between said multiplexer controller terminal and each of said multiplexer machine terminals.

4,047,004
SIMULATION OF COMPLEX SEQUENCES OF MULTI-STAGE SEPARATORS

Alfred M. Peiser, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 179,984, Sept. 13, 1971, which is a continuation of Ser. No. 92,534, Nov. 24, 1970, abandoned, which is a continuation of Ser. No. 562,808, July 5, 1966, abandoned. This application May 24, 1976, Ser. No. 689,262

Int. Cl.² G05B *17/00*; G06F *15/20*

U.S. Cl. 235—151.12 **5 Claims**

1. In separation processes wherein a multicomponent feed stream in which the relative volatility of the individual components thereof are relatively insensitive to changes in temperature is supplied to a multi-stage fractionating tower, the method comprising:

performing heat, material and equilibrium balances for the stages of said tower to determine a singla principal variable S at each stage representing the product of the flow ratio times the equilibrium constant of a base component at the temperature of that stage and with initially assumed values representative of constant relative volatilities of said components based upon assumed temperatures, and

repeating the heat, material and equilibrium balances with new values for said constant relative volatilities based upon the newly found temperatures for the respective stages to determine a new value of the principal variable S at each stage until the last newly found temperatures substantially correspond with the assumed temperatures.

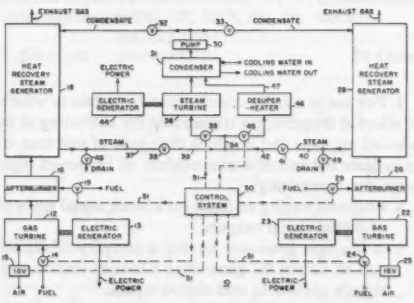
4,047,005
COMBINED CYCLE ELECTRIC POWER PLANT WITH A STEAM TURBINE HAVING A THROTTLE PRESSURE LIMITING CONTROL

Richard S. Heiser, Pittsburgh, and Ola J. Aanstad, Greensburg, both of, PA, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 13, 1974, Ser. No. 497,345

Int. Cl.² F01K *23/00*; F02C *1/04*; G05B *15/00*

U.S. Cl. 235—151.21 **18 Claims**



1. A combined cycle electric power plant comprising:

a. gas turbine means;

b. means for generating steam at a lower distinct rate and a higher distinct rate in response to heat energy from the gas turbine means;

c. a steam turbine driven by steam supplied to it from the steam generating means;

d. means for generating electric power under the driving power of said turbines;

e. means for controlling the operation of said turbines including a steam turbine control system;

f. said steam turbine control system including

f1. means to generate a first representation of actual steam pressure to the turbine,

f2. means to generate a second representation of steam flow,

f3. means to generate a third representation of a predetermined minimum steam pressure,

f4. means governed by the first representation and the third representation to restrict the flow of steam to the turbine only at times when the third representation exceeds the first representation while the steam generating means is generating steam at the higher of the two distinct rates, and

f5. means responsive to the steam generating means changing to the lower distinct rate to restrict the flow of steam to the turbine at times when the second representation exceeds the first representation.

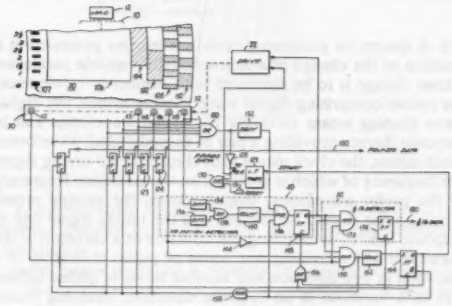
4,047,006
ELECTRONIC POSTAGE SCALE

Edwin Ellner, Oxford, Conn., assignor to Better Packages, Inc., Shelton, Conn.

Filed Jan. 27, 1976, Ser. No. 652,843

Int. Cl.² G06F *15/02*; G01G *23/42*

U.S. Cl. 235—151.33 **25 Claims**



1. A postage scale for providing an indication of the requisite postage for a parcel in accordance with the weight, class of shipment and destination zone of said parcel, comprising:

weight data generating means for generating a digital representation of the weight of said parcel upon which postage is determined;

memory means having a plurality of individual storage sections corresponding to said classes of shipment; each of said storage sections including a two-dimensional array of storage locations, a first dimension being defined by destination addresses and a second dimension being defined by weight increments and at which storage locations postage data representations corresponding to destination zones and parcel weight are stored;

first manually operable switch means for generating, when operated, a signal representing a selected class of shipment;

second manually operable switch means for generating, when operated, a signal representing a selected destination zone;

encoding means coupled to said first and second switch means and responsive to said generated signals for producing a coded signal representing a destination address;

means coupled to said first switch means for selecting one of said storage sections in accordance with the generated signal representing said selected class of shipment;

means coupled to said weight data generating means for supplying said digital representation of parcel weight to all of said storage sections; and

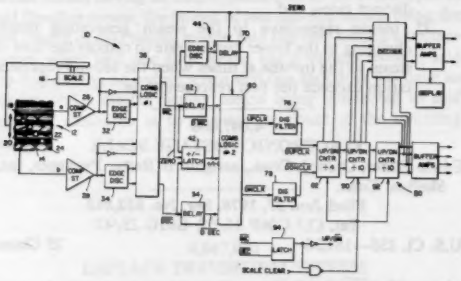
read-out means coupled to all of said storage sections for reading out the one postage data representation stored in the storage section selected by said first switch means at the location defined by the coded signal produced by said encoding means and the digital representation of said parcel weight.

4,047,007

CLOCKED DIGITAL COUNTING SYSTEM

Daniel F. Dlugos, Huntington, and Flavio M. Manduley, Seymour, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Aug. 19, 1976, Ser. No. 715,882
Int. Cl.[2] G01G *3/00*; H03K *21/00*
U.S. Cl. 235—151.33 **9 Claims**



1. A system for processing cyclic waveforms generated as a function of the change of a bidirectionally variable parameter whose change is to be measured with respect to a reference, the system comprising digital wave shaping means, the digital wave shaping means receiving the cyclic waveforms and in response thereto providing a pair of shaped digital waveforms, clock means, the clock means providing a pulsed timing signal the frequency of which is greater than the maximum frequency of the cyclic waveforms, sensing means, the sensing means receiving the shaped waveforms and the timing signal and in response thereto determining the direction of a variation of the parameter and providing one series of pulses indicative of a variation in one direction and another series of pulses indicative of a variation in an opposite direction, counting means disposed in the system and coupled to the sensing means to receive either one of said series of pulses and the timing signal and in response thereto being adapted to add the pulses of the one series or to subtract the pulses of the other series to provide signals indicative of a measure of the varation in the parameter and processing means electrically connected within the system for receiving said signals and in response thereto providing an indication of the change of the bidirectionally variable parameter with respect to the reference, whereby reliable noise insensitive processing is provided.

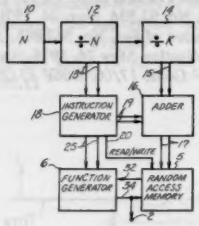
4,047,008

PSEUDO-RANDOM NUMBER SEQUENCE GENERATOR

Frank A. Perkins, Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Feb. 23, 1976, Ser. No. 660,115
Int. Cl.[2] G06F *7/00*
U.S. Cl. 235—152 **7 Claims**

1. A pseudo-random number sequence generator comprising: a random access memory having a plurality of addressable storage locations, each for storing a number; a logic function generator means for operating upon at least a first and second number to provide a result; addressing means for accessing a first number from a first storage location of said random access memory and for accessing a second number from a second storage location having a predetermined location with respect to said first storage location; means providing said first and second numbers to said logic function generator means such that a result is provided, and means for providing the result as an output random number and for writing the result in said second storage location, whereby said second number is replaced by said result and whereby a cycle is complete; and control means for controlling said addressing means and said



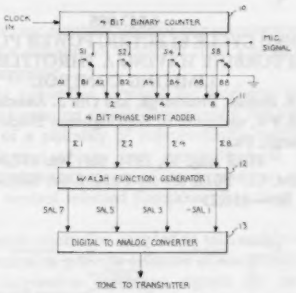
logic function generator means and said memory means for performing successive said cycles such that during each cycle the storage location having a result of a previous cycle comprises the first storage location.

4,047,009

DIGITAL TONE GENERATOR FOR USE WITH RADIO TRANSMITTERS AND THE LIKE

Richard F. Challen, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed Apr. 19, 1976, Ser. No. 677,973
Int. Cl.[2] G06F *15/34*; H04B *1/16*
U.S. Cl. 235—152 **6 Claims**



1. For use in a radio communication system in which a tone of selected frequency is transmitted for activating at least one selected receiver and in which the phase of said tone is shifted to indicate the end of a transmission, an improved digital tone generator comprising:

a. a counter having an input for a clock signal and a plurality of digital signal outputs;

b. a function generator having a plurality of digital inputs and an output for generating a tone in response to digital signals applied to said digital inputs;

c. and a digital adder connected between said counter outputs and said generator inputs for applying said counter digital signals to said function generator, said digital adder having means for adding selected digital signals to said function generator inputs in response to the end of a transmission, thereby changing the phase of said function generator output to indicate to said one selected receiver that the transmission is ended.

4,047,010

MULTI-FUNCTIONAL ELECTRONIC WATCH

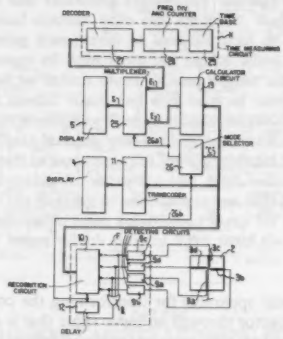
Jean Félix Perotto, Neuchatel, and Eric Vittoz, Cernier, both of Switzerland, assignors to Centre Electronique Horloger S.A., Neuchatel, Switzerland

Filed Aug. 26, 1975, Ser. No. 607,924

Claims priority, application Switzerland, Sept. 4, 1974, 12036/74

Int. Cl.² G06F 7/38; G04B 47/00; G06K 9/10

U.S. Cl. 235—156 13 Claims



1. A multi-functional electronic watch, comprising an electro-optical digital display means; circuit means coupled to said display means for measuring time; a data processing circuit coupled to said display means; a writing surface including a plurality of pick-up electrodes embedded in the glass of said watch, said pick-up electrodes delivering a series of signals corresponding to the given order in which each of them is excited when an alpha-numerical symbol is traced analogically on the surface of said glass, said series of signals forming a combinatory code; and interface means connecting said pick-up electrodes to said data processing circuit for recognizing said combinatory code and supplying data signals to said processing circuit, said data signals corresponding unequivocally to said symbol.

4,047,011

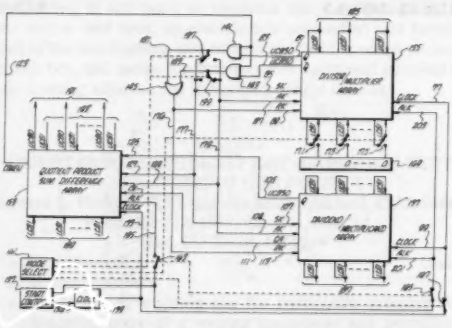
MODULAR APPARATUS FOR BINARY QUOTIENT, BINARY PRODUCT, BINARY SUM AND BINARY DIFFERENCE GENERATION

Walter Scott Bennett, Loveland, Colo., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 489,884, July 19, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 639,517

Int. Cl.² G06F 7/52

U.S. Cl. 235—164 21 Claims



1. A high-speed divider for binary numbers, comprising:

a divisor array comprising a plurality of like structured modules;

a dividend array comprising a plurality of like structured modules, like the modules in said divisor array;

a quotient array comprising a plurality of like structured modules, like the modules in said divisor array and said dividend array; and

control means, responsive to the divisor array, for generating signals indicative of manipulative control steps for said divisor array, said dividend array, and said quotient array.

4,047,012

GENERAL PURPOSE CALCULATOR HAVING FACTORIAL CAPABILITY

Peter D. Dickinson, Monte Sereno; Thomas E. Osborne, San Francisco; France Rode; Allen J. Baum, both of Los Altos; David S. Cochran, Palo Alto, and Chung C. Tung, Santa Clara, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 364,570, May 29, 1973, abandoned. This application Apr. 8, 1975, Ser. No. 566,631

Int. Cl.² G06F 15/20

U.S. Cl. 235—156 2 Claims

1. An electronic calculator for calculating the factorial of a positive number entered into the calculator, said calculator comprising:

input means including a plurality of manually operable numeric and non-numeric keys for entering information into the calculator;

a first storage register for initially storing the entered number and for subsequently storing decremented values thereof; and

a second storage register coupled to the first storage register having a first field including one's and ten's digit positions for storing a preselected constant number in the ten's digit position thereof, and a second field for storing a number;

a third storage register coupled to the first and second storage registers having a first field including one's and ten's digit positions for storing successively modified values of the entered number, and a second field for storing a number;

processing means responsive to the actuation of a non-numeric key of the output means and coupled to the first, second and third storge registers for repetitively decrementing the entered number unless that number is zero, and, following each such decrementing, transferring each decremented value of the entered number to the first field of the third register, for performing a first series of successive additions to the contents of the first and second fields on the second and third storage registers, respectively, the sums of the first series of successive additions being stored in the first and second fields, respectively, of the third register, until the ten's digit position of the first field of the third register equals a first value, thereupon left-shifting the numbers stored in the first and second fields of the third register so that the one's digits of those numbers occupy the ten's digit positions of those fields, for per-

forming a second series of successive additions of the contents of the first and second fields of the second storage register to the left-shifted contents of the first and second fields of the third register, respectively, the sum of the second series of successive additions being stored in the first and second fields, respectively, of the third register, until the ten's position of the first field of the third register equals the first value, for repetitively storing the resultant number in the second field of the third storage register in the second field of the second register, and then zeroing the second field of the third register; and

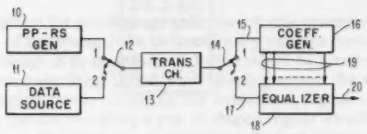
output means coupled to the processing means for providing an output indication of the total of the first and second series of successive additions of the contents of the second field of the second storage register and the second field of the third storage register, said total representing the factorial of the entered number.

4,047,013

METHOD AND APPARATUS FOR FAST DETERMINATION OF INITIAL TRANSVERSAL EQUALIZER COEFFICIENT VALUES

Andrzej Milewski, St-Jeannet, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 1, 1976, Ser. No. 701,730
Claims priority, application France, July 10, 1975, 75.22152
Int. Cl.[2] G06F *15/34*; H04B *3/14*
U.S. Cl. 235—156 **8 Claims**



1. In a synchronous data transmission system comprising a transmitter for transmitting data through a transmission channel causing distortions to a receiver including a transversal equalizer to compensate for the effects of said distortion, a method for determining the initial values of the equalizer coefficients comprising the steps of:

selecting among the periodic binary pseudorandom sequences of length L, a sequence (u_1) of L binary elements u_i having the following property:

$$A_0 = L \text{ and } A_j = -1 \text{ for } j = 1, \ldots (L-1)$$

where

$$A_j = \sum_{i=0}^{L-1} u_i u_{i+j}$$

adding to each element u_i of the sequence (u_i) a constant m defined by the following relation:

$$m = \frac{-1 \pm \sqrt{1+L}}{L}$$

whereby building a sequence (v_i) of L elements $v_i\, v_i = u_i + m$;

transmitting said sequence (v_i) through the transmission channel;

receiving the sequence (x_i) of elements x_i, each of the received elements x_i corresponding to a transmitted element v_i, and

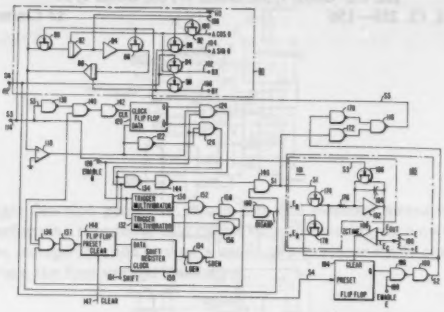
determining the initial values of the equalizer coefficients from the received sequence (x_i) and the transmitted sequence (v_i).

4,047,014

COORDINATE CONVERTER

Steven Morrison, Baltimore, and George A. Williams, Ellicott City, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 2, 1976, Ser. No. 672,893
Int. Cl.[2] G06G *7/22, 7/80*
U.S. Cl. 235—189 **11 Claims**



1. Electronic apparatus for transforming the coordinates of at least one vector through an input angle that is a measure of rotation of a first orthogonal coordinate system relative to a second orthogonal coordinate system about a common coordinate axis comprising:

first means for generating a first signal representative of said vector;

second means for generating a second signal representative of said input angle;

third means for generating an oscillation angle control signal having a transition point wherein an incremental change in said second signal at a first predetermined value causes a discontinuity in the duration of said oscillation angle control signal;

coordinate converter means responsive to said oscillation angle control signal for transforming said first signal in accordance with said second signal; and

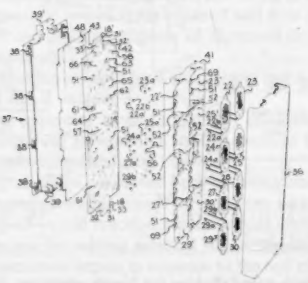
fourth means for modifying the duration of said oscillation angle control signal to effectively eliminate said discontinuity within a selected range of said second signals.

4,047,015

PHOTOFLASH ARRAY CONSTRUCTION

Richard Blount, South Euclid, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 508,334, Sept. 23, 1974, abandoned. This application Nov. 28, 1975, Ser. No. 635,848
Int. Cl.[2] G03B *15/02*
U.S. Cl. 240—1.3 **8 Claims**



1. A multiple flash lamp array comprising a housing having

a front and a back, a plurality of flash lamps in a planar configuration and disposed within said housing adjacent the front thereof, reflector means positioned within said housing and having portions located behind said lamps to direct light from said lamps toward the front of said housing when said lamps are flashed, a circuit board positioned within said housing behind said lamps and said reflector means and having circuitry thereon for causing flashing of said lamps in response to the transmission of flash actuation signals to said circuitry, openings through the back of said reflector means, leads on said lamps and extending rearwardly through said openings into electrical contact with said circuitry, said front of said housing being transparent at least in front of said lamps to permit passage of light from the lamps when the latter are flashed, and an indicia sheet located within said housing between said circuit board and said back of said housing, said indicia sheet containing flash indicator means thereon facing the back of said housing, said back of said housing being transparent at least in part to permit viewing of said flash indicator means, and means for actuating said flash indicator means in response to the flashing of said flash lamps, said flash indicator means being visible from behind said array for indicating the flashing of lamps which project light from the front of said array.

4,047,016

BATHROOM CABINET LIGHTING FIXTURE

James J. Palka, Arlington Heights, Ill., assignor to General Bathroom Products Corporation, Elk Grove Village, Ill.

Filed May 14, 1976, Ser. No. 686,675
Int. Cl.² F21V *33/00*
U.S. Cl. 240—4 **2 Claims**

1. Side lighting arm fixtures for cabinets used in bathrooms and mounted on a wall, said cabinets comprising a one piece, molded plastic cabinet body with ornamental hollow framing therearound having depending rearwardly extending flanges on the margin of said framing forming top, side and bottom walls, said side walls having cutouts adjacent the bottom wall, in combination with a pair of light arm brackets, each comprising a one piece, plastic molded, elongated horizontal portion and a right angled portion, an elongated rectangular portion formed on the terminal end of said latter portion extending vertically, said rectangular portion having a cylindrical bore therein, a cable conduit molded in said bracket with one end terminating in said bore, an electrical lamp socket secured at one end in said bore, an electric box secured to said bottom wall of the said framing, said other end of said conduits secured to said box, and means for fastening said horizontal portions to said framing adjacent the lower end of said cabinet.

4,047,017

ADJUSTABLE FLASHLIGHT SWINGABLE BRACKET FOR A WRITING INSTRUMENT

Bernard D. Herring, 712 Longridge Road, Oakland, Calif. 94610

Filed Mar. 22, 1976, Ser. No. 668,784
Int. Cl.² B43K *29/10*
U.S. Cl. 240—6.46 **1 Claim**

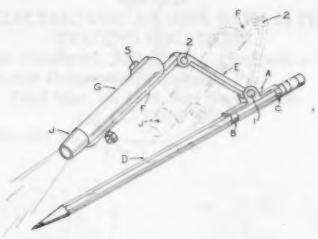
1. In combination:

a. a base having a spring clip for frictionally gripping the elongated body of a writing instrument and permitting adjustment along the length of the body;

b. an arm having one end pivotally secured to said base and being swingable from a position substantially paralleling the elongated body of the writing instrument into a desired angular position with respect to the axis of the body;

c. a flashlight supporting platform having one end pivotally connected to the free end of said arm, the axis of said platform lying in a radial plane that extends from the axis of the elongated writing instrument, the elongated axis of said arm lying in the same plane regardless of its angular position; and

d. said platform supporting a flashlight whose light rays are always beamed along said radial plane regardless of the angle made between said platform axis and said supporting arm axis, the angle of the light rays being adjusted by the swinging of said platform and said arm for directing the light rays toward the writing end of said instrument for



illuminating a surface over which the writing instrument is moved, said pivotal connections between the base, arm and platform holding said arm and platform in adjusted position so that both will space the flashlight away from the body of the writing instrument for permitting the latter to be manually grasped without interfering with the flashlight;

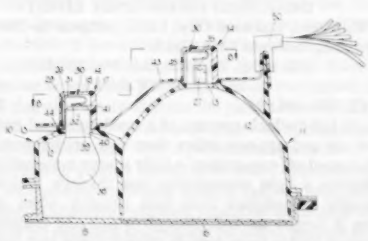
e. said platform being provided with a spring clip for removably engaging the body of the writing instrument when said arm and platform are swung into substantial linear alignment with each other, said last mentioned spring clip when engaging with the body of the writing instrument holding said platform and arm close to and substantially parallel with the adjacent side of the elongated body of the writing instrument.

4,047,018

LAMP ASSEMBLY

Mervyn George Harris, Solihull, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Dec. 3, 1975, Ser. No. 637,179
Claims priority, application United Kingdom, Dec. 14, 1974, 54150/74
Int. Cl.² B60Q *1/00, 3/00, 11/00*
U.S. Cl. 240—7.1 R **11 Claims**



1. A lamp assembly comprising a body, means defining an aperture in said body, an electrically insulating bulbholder enclosing said aperture and detachably receiving a bulb, at least one electrical contact fixed in said bulbholder for engagement with said bulb, an electrical terminal connected to each

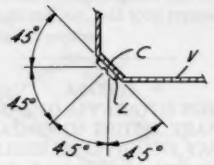
said electrical contact and carried by said bulbholder, and an electrical connector for connecting each said electrical terminal to a power supply, each said electrical connector being trapped between its respective electrical terminal and said body so as to be electrically connected with said respective electrical terminal.

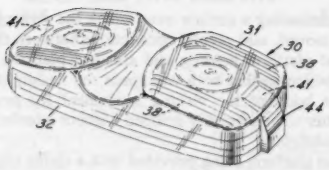
4,047,019

COMBINED CLEARANCE AND MARKER LAMP

Robert I. Nagel, Skokie, Ill., assignor to Dominion Auto Accessories Limited, Toronto, Canada

Filed July 19, 1976, Ser. No. 706,746
Int. Cl.² B60Q 1/32
U.S. Cl. 240—8.2 **15 Claims**





1. A combined clearance and marker lamp comprising

a generally rectangular housing having a base portion and a peripheral wall including side wall portions and end wall portions,

means for supporting a pair of light bulbs in longitudinally spaced relation in said housing with at least the filaments of said bulbs beneath the plane of the upper end of the peripheral wall of the housing,

a lens of transparent material on said housing and having a top wall, side walls and end walls telescoped over the side and end wall portions of the housing,

said top wall of said lens having longitudinally spaced sets of arcuate ribs on the inside surface of the top wall,

each said end wall of said lens having a prism on the outer surface thereof to direct the light longitudinally thereof.

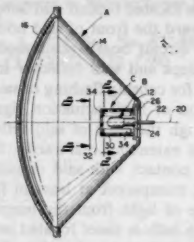
4,047,020

DISGUISED EMERGENCY LIGHT

Don W. Noren, Redwood City, Calif., assignor to Noren Products, Inc., Redwood City, Calif.

Filed Oct. 28, 1975, Ser. No. 626,494
Int. Cl.² F21V 9/08
U.S. Cl. 240—46.59 **25 Claims**

24. A light which appears of a predetermined color when turned on and appears other than said predetermined color when turned off comprising; a light source mounted in a housing having a light transmitting lens through which light is outwardly transmitted from said housing when said light source is turned on and through which the interior of said housing is visible from outside thereof when said light source is turned off, light transmitting color means of a predetermined color positioned within said housing in spaced relationship to said lens and closely adjacent said light source for imparting light transmitted outwardly therethrough from said light source with said predetermined color, and disguise means positioned within said housing closely adjacent said color means for transmitting light of said predetermined color outwardly therethrough and for blocking a substantial portion of



external light rays entering said housing through said lens from being imparted with said predetermined color by said color means.

4,047,021

CASTING CONSTRUCTION

Arnold Francis Winant, Beechhurst, N.Y., assignor to Gim Metal Products, Carle Place, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,444
Int. Cl.² F21S 1/06
U.S. Cl. 240—78 E **5 Claims**

1. A suspension type electric light fixture comprising a vertically axially extending hollow open bottomed body member including an upper vertical elongated tubular stem section terminating at its top in an integrally formed coaxial vertical hub section having a threaded vertical axial bore extending for the full length thereof, a light bulb socket, means supporting said light bulb socket from said hub and including an externally threaded pipe engaging said threaded bore and depending therefrom coaxially with said stem section and supporting said light socket at its lower end, and a suspension loop member located atop and projecting upwardly from and integrally formed with said hub section.

4,047,022

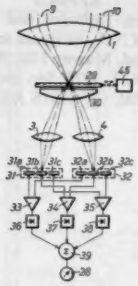
AUTO FOCUS WITH SPATIAL FILTERING AND PAIRWISE INTERROGATION OF PHOTOELECTRIC DIODES

Werner H. Holle, Wetzlar, Germany, assignor to Ernst Leitz GmbH, Wetzlar, Germany

Filed Jan. 13, 1976, Ser. No. 648,785
Int. Cl.² G01J 1/20
U.S. Cl. 250—201 **7 Claims**

1. In an apparatus for photoelectrically determining the position of at least one focal plane of an image inside an optical instrument comprising optical components for imaging at least one object on at least one spatial frequency filter of an optical image correlator and further comprising a measurement display of the light fluxes filtered through the spatial frequency filter, the improvement comprising: means for receiving the

light fluxes concentrated through said optical components having at least one photoelectric detector system consisting of at least one row of a plurality of photoelectric detecting diodes



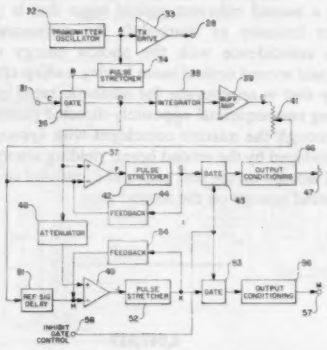
and electrical means for pairwise interrogation of said photoelectric detecting diodes and for the annalysis of the photoelectric signals generated during interrogation.

4,047,023

COLOR MARK DETECTOR WITH PULSED SOURCE AND SYNCHRONOUS DEMODULATION

Paul Franklyn Key, San Martin, and Anthony Ross Lazzara, Portola Valley, both of Calif., assignors to Scientific Technology Inc., Mountain View, Calif.

Filed Aug. 9, 1976, Ser. No. 712,607
Int. Cl.[2] H01J *39/12*
U.S. Cl. 250—214 B **13 Claims**



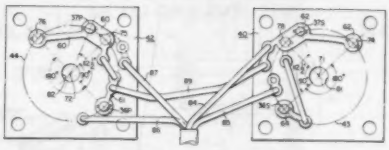
1. A mark detector for a mark on a surface having a contrasting background, comprising a framework, said framework having an aperture through one wall thereof, a light source mounted in said framework disposed to direct a light beam through said aperture, a light sensor mounted in said framework disposed to receive light reflected from the surface when the surface is positioned before said aperture, said light source providing a sensor output signal responsive to received light, means for driving said light source at a pulse frequency, thereby producing light source pulses, a gate for sampling said sensor output synchronously with said light source pulses during a gating period and providing a gated output, whereby noise occurring between said light source pulses is barred from said gated output, an integrator coupled to receive said gated output and providing an integral output, a comparator coupled to receive said integral output and said gated output at separate input terminals, whereby a predetermined comparator output state is produced during said gating period when a predetermined difference in levels between said integral and gated outputs occurs, and means for conditioning said comparator output coupled to said predetermined comparator output state and providing a mark output when a surface color passes before said aperture which contrasts with the background.

4,047,024

PHOTOELECTRIC DISC READER WITH ALTERNATE READING LOCATIONS

Benjamin B. Henderson, Raleigh, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 18, 1976, Ser. No. 668,029
Int. Cl.[2] G01D *5/34*
U.S. Cl. 250—231 SE **2 Claims**



1. A pulse initiator for producing pre-selected pulse rates in a three wire remote metering telemetry system in response to equal rotations of a watthour meter rotating movement, said pulse initiator comprising:

first and second parallel mounting boards assembled to a watthour meter;

plural pattern discs, each having different numbers of equally circumferentially spaced slot indicia disposed in identical circular tracks, each of said plural pattern discs being interchangeably mountable between said first and second mounting boards in driven relationship with the meter rotating movement;

first and second optoelectronic sensors each including a radiation source optically aligned with a radiation pickup, said sources and pickups of said first and second sensors having plural alternate mounting locations on identical circular axes of said first and second mounting boards, respectively, so as to have plural alternate circumferential spacings therebetween, said circular axes being oriented for alignment with each other and said circular tracks of said pattern discs, each of said alternate circumferential spacings being associated with a different one of said pattern discs so as to have a related arcuate spacing equal to a multiple of the indicia slot spacing plus one-half of the slot spacing, whereby rotation of the slotted indicia between the sensors and pickups produces interrupted radiations that alternately activate the pickups of said first and second sensors and produce alternate equally spaced impulses in accordance with a preselected pulse rate;

first and second printed circuit conductors disposed on said first and second mounting boards, respectively, and extending to alternate mounting locations for at least one of each of the radiation sources and radiation pickups so as to provide fixed common electrical connections between the alternate source and pickup mounting locations; and

circuit means including an output pulse generator connected to a three wire telemetry system and receiving said impulses so as to produce output pulses at said preselected pulse rate.

4,047,025

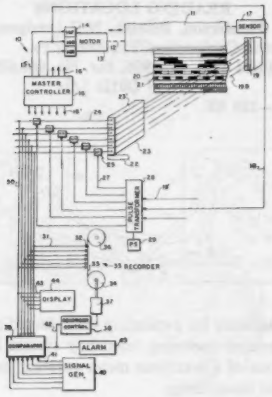
POSITION INDICATING SYSTEM AND METHODS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation-in-part of Ser. No. 220,347, Jan. 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 864,510, Oct. 7, 1969, Pat. No. 3,636,635, Ser. No. 518,616, Jan. 4, 1966, Pat. No. 3,476,481, Ser. No. 294,076, July 10, 1963, Pat. No. 3,481,042, Ser. No. 250,942, Jan. 11, 1963, Pat. No. 3,266,833, and Ser. No. 477,467, Dec. 24, 1954, abandoned. This application May 17, 1974, Ser. No. 470,823

Int. Cl.[2] H01J 3/14

U.S. Cl. 250—237 G 11 Claims



1. An apparatus for measuring an indicating machine component position comprising:

a base,

a machine component movably supported by said base,

means for guiding and controllably driving said machine component on said base in a predetermined path to effect relative controlled movement of said component and said base with respect to each other,

a digital code scale fixedly supported by said machine component and movable therewith so as to permit said code scale to move with respect to said base when said component is driven on said base,

scanning means supported adjacent said machine component and operatively located to scan said digital code scale as the machine component and scale and said base relatively move with respect to each other,

said scanning means being operable to generate digital information as code signals as said scanning means said digital code scale, which code signals are indicative of the degree of relative movement of said component with respect to said base, and

transducing means operatively connected to receive said code signals generated by said scanning means and operable to effect a transducing operation with respect to the signals generated by said scanning means, and means connected to said transducing means for receiving and utilizing the information generated by said transducing means.

4,047,026

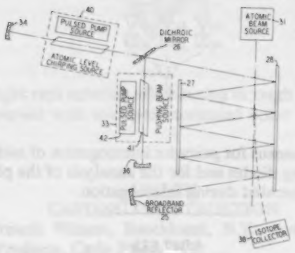
DEFLECTION OF ATOMIC BEAMS WITH ISOTOPE SEPARATION BY OPTICAL RESONANCE RADIATION USING STIMULATED EMISSION AND THE A.C. STARK EFFECT

John Ernst Bjorkholm, Holmdel, and Paul Foo-Hung Liao, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 2, 1976, Ser. No. 646,064

Int. Cl.[2] H01S 1/00

U.S. Cl. 250—251 3 Claims



1. A method for separation of isotopes comprising the steps of supplying a mixture of the desired isotope and at least one isotope not desired to an interaction region, supplying a first coherent optical beam that is pulsed and selected for resonance radiation interaction, whereby a force is to be exerted on the selected isotope, the frequency of said first source being offset from the resonance by a selected amount, supplying to said mixture a second coherent optical beam that is pulsed with sufficient intensity to Stark-shift the resonance transition through coincidence with the photon energy of the first source, said second optical beam having a chirp rate of optical intensity that is appropriate for adiabatic rapid passage, and providing two sequential oppositely-directed passes of the first beam through the mixture coincident with appropriate Stark shifts produced by the second beam, yielding absorption by the selected isotope on the first pass and stimulated re-emission by the selected isotope on the second pass.

4,047,027

NEUTRON WELL LOGGING TECHNIQUE FOR GAS DETECTION

Richard M. Bateman, Chicago, Ill., and Christian M. Clavier, Ridgefield, Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 585,738, June 10, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,905

Int. Cl.[2] G01V 5/00

U.S. Cl. 250—264 19 Claims

1. A method for determining characteristics of an earth formation, comprising the steps of:

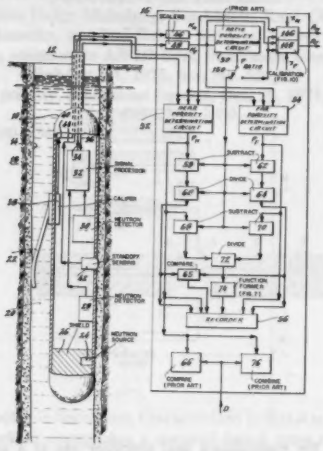
producing a first measurement of the neutron population in said formation at a first spacing from a neutron source;

converting said first measurement into a first signal which is related to the porosity of the formation and corrected for environmental effects;

producing a second measurement of the neutron population in said formation at a second spacing from said neutron source;

converting said second measurement into a second signal

which is related to the porosity of the formation and corrected for environmental effects; and



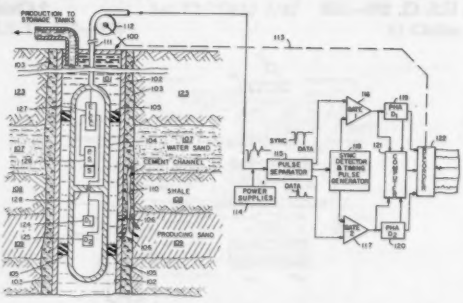
determining from said converted signals characteristics of the formation.

4,047,028

RESOLUTION OF THROUGH TUBING FLUID FLOW AND BEHIND CASING FLUID FLOW IN MULTIPLE COMPLETION WELLS

Dan M. Arnold, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,173
Int. Cl.[2] G01V 5/00
U.S. Cl. 250—266 **9 Claims**



1. A method for detecting the direction, linear flow rate and volume flow rate of undesired behind casing water migration in an upper producing zone of a multiple completion well operating on gas lift, wherein the upper completion zone has a production tubing string of known diameter passing therethrough from a lower completion zone which contains water cut fluid flowing at a substantially known volume flow rate in an upward direction, substantially without interrupting production from either of the completion zones, comprising the steps of:

a. locating a well tool sized and adapted for passage through production tubing and having a source of fast neutrons at least some of which having sufficient energy to cause the nuclear reaction $O^{16}(n,p)N^{16}$ and at least two gamma ray detectors longitudinally spaced from said source and each other, in an upper producing zone of the well at a location adjacent either above or below producing perforations to be investigated;

b. irradiating the borehole environs with fast neutrons from said source;

c. detecting at said detector locations in at least two separate energy regions of the gamma ray energy spectrum, gamma rays substantially caused by the decay of the unstable isotope N^{16} comprising the molecular structure of any undesired behind casing water migration and any water cut flowing in the production tubing from the lower producing zone, and generating at least four separate count signals representative thereof;

d. combining said at least four separate count signals according to a first predetermined relationship to derive an indication of the linear flow rate of any undesired water flow behind the casing in the upper producing zone; and

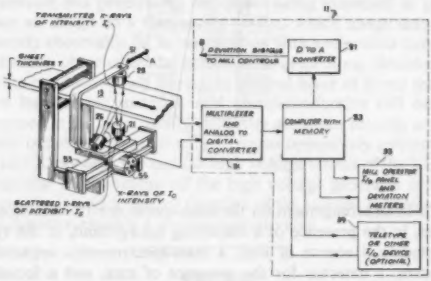
e. combining the known volume flow rate and linear flow rate of the water cut in the production tubing from the lower producing zone and said at least four count signals according to a second predetermined relationhsip to derive an indication of the volume flow rate of the undesired water flow behind the casing in the upper producing zone.

4,047,029

SELF-COMPENSATING X-RAY OR γ-RAY THICKNESS GAUGE

John J. Allport, 12298 Candy Court, Saratoga, Calif. 95070

Filed July 2, 1976, Ser. No. 702,285
Int. Cl.[2] G01N 23/20, 23/00
U.S. Cl. 250—273 **16 Claims**



1. A system for continuously measuring the mass per unit area of sheet material, whose composition is slightly variable from nominal comprising,

radiation generating means for generating a radiation beam directed into said sheet, said radiation having sheet in a straight line from said generating means and a second portion of said beam is scattered from said sheet,

first detector means positioned on the opposite side of said sheet from said radiation generating means in a position to intercept said first portion of said beam for measuring the intensity of said first portion of said beam, and having a first output signal representative of beam intensity transmitted through said sheet material,

second detector means disposed in a position to intercept part of said second beam portion for measuring the intensity of said part and having a second output signal representative of beam intensity scattered from said sheet material,

computing means connected to said first and second detector means for continuously computing the transmission ratio, R_1, by dividing said first output signal by the signal output of said first detector means in the absence of sheet material and computing the scattering ratio, R_2, by dividing said second output signal by the signal output of said second detector means in the presence of very thick standard sheet material, said transmission and scattering ratios, R_1 and R_2 being represented by electrical signals, said computing means including reference means for receiving inputs of nominal material composition and for having stored calibration data therein with respect to said material composition and further having as inputs said signals representative of said transmission ratio, R_1, and said

scattering ratio, R_2, said computing means using said ratios R_1 and R_2 with said calibration data and having as an output a corrected absorption coefficient signal μ_c, said reference means having circuit means interacting with said computing means for receiving said absorption coefficient signal μ_c, and said transmission ratio signal R_1 for generating a material mass per unit area signal, ρT, and an output means for delivering said mass per unit area signal.

4,047,030

ARRANGEMENT FOR THE MASS-SPECTROMETRIC DETECTION OF IONS

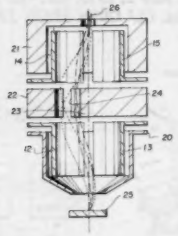
Ernst Lobach, Triesenberg, Liechtenstein, assignor to Balzers Patent-und Beteiligungs-Aktiengesellschaft, Liechtenstein

Filed Sept. 24, 1975, Ser. No. 616,267

Claims priority, application Switzerland, Sept. 30, 1974, 13139/74

Int. Cl.² H01J *39/34*

U.S. Cl. 250—281 **7 Claims**



1. In an arrangement for the mass-spectrometric detection of ions, in the presence of a disturbing background, of the type including a source of ions, a mass-spectrometric separating system, a detector for the presence of ions, and a focusing device for the ions interposed between the source and the detector, an improved focusing device comprising an asymmetric electrostatic focusing lens system having a lens axis, an ion entrance aperture, and an ion exit aperture, and having at least a portion thereof assymetric to at least one of said apertures; said assymetric electrostatic focusing lens system suppressing the passage of disturbing particles while providing substantially unrestricted passage of ions between said entrance and exit apertures.

4,047,031

APPARATUS FOR OBTAINING RADIOGRAPHS

Lee Fitzpatrick Frank, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 22, 1976, Ser. No. 679,550

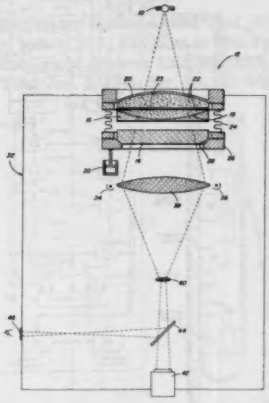
Int. Cl.² G01T *5/04*

U.S. Cl. 250—335 **10 Claims**

1. Radiographic apparatus for operation with a source of X-rays, said apparatus comprising:

means defining an air-tight chamber having a first, optically transparent end wall and a second, X-ray transparent end wall positioned between said X-ray source and said first end wall;

a mixture in said chamber, said mixture comprising (1) an X-ray absorber gas having an atomic number of at least 36, said absorber gas acting as an ion and electron emitter when exposed to X-rays, and (2) a supersaturated vapor adapted to condense on said ions and electrons whereby the path of the X-rays will be made visible; and



means for maintaining said absorber gas at a superatmospheric pressure so as to be substantially X-ray opaque.

4,047,032

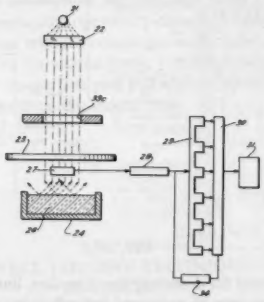
STANDARD FOR SPECTRAL REFLECTANCE

John F. X. Judge, and Jerome Salpeter, both of Yorktown Heights, N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed June 9, 1975, Ser. No. 585,008

Int. Cl.² G01N *21/22, 21/48*

U.S. Cl. 250—338 **2 Claims**



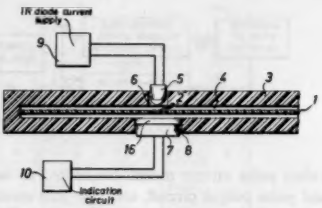
2. In an analyzer for quantitation of at least one constituent of interest of a sample by near infrared reflectance measurements, having means for irradiating a sample and a calibrating standard with light in the near infrared spectral region, detector means for receiving diffuse reflected light from said sample and said standard, such standard having known reflectance characterisitics in said spectral region, and means displaying the analytical results, the improvement wherein: said standard comprises a fired ceramic element having a surface for irradiation by said irradiating means to diffusely reflect said light, said element further having thickness to be self-supporting and having diffusivity and relatively low transmissive characteristics such that the characteristics of said reflected light are substantially determined by the material comprising said element and are essentially optically flat in the wavelength range of 1.4–2.4 micrometers, and wherein said standard comprises alumina.

4,047,033

CHECKING AN IDENTITY, AUTHORITY OR CHECK DOCUMENT OR THE LIKE

Thor Anders Helge Malmberg, Stockholm; Knut Göran Högberg, Hasselby, and Stig Roland Sjöquist, Vallentuna, all of Sweden, assignors to AB ID-Kort, Stockholm, Sweden

Filed Oct. 21, 1975, Ser. No. 624,473
Claims priority, application Sweden, Oct. 25, 1974, 7413480
Int. Cl.[2] G01J *1/00*
U.S. Cl. 250—341 28 Claims



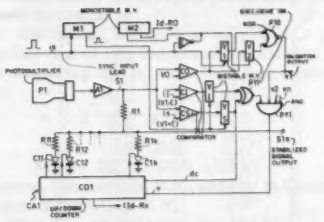
1. A checkable document, characterized in that it is provided with a marking comprising a material based upon rare earth metals, with the property that when excited by longer wave radiation it emits shorter wave radiation.

4,047,034

AUTOMATIC SYSTEM FOR CONTINUOUSLY CALIBRATING A GAMMA CAMERA

Michel Joseph Auphan, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,622
Claims priority, application France, Sept. 27, 1974, 74.32687
Int. Cl.[2] G01J *1/42*
U.S. Cl. 250—354 11 Claims



1. An automatic system for the continuous re-calibration of a gamma ray camera comprising a scintillation crystal, a light conductor disposed proximate said crystal, a plurality of signal channels each including a photomultiplier disposed proximate said conductor, said automatic system comprising,

a device means for forming a reference light signal for the photomultipliers, said device means being disposed among said photomulitipliers, a generator means coupled to said device means for controlling the pulsed periodical calibration operation,

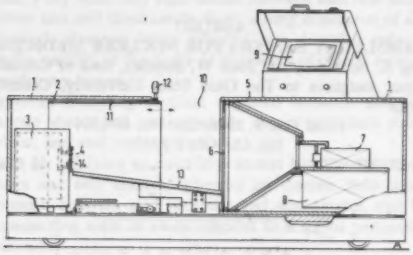
a plurality of cooperating circuits means coupled to said generator means for stabilizing the gain factor in each of said channels respectively at a value between a lower limit and an upper limit of a range about an initial gain factor, each of said stabilizing means comprising a resistance bridge including a plurality of resistors coupled to said photomultipliers, and means for changing the ratio of said resistors; and means for determining said initial gain factor with respect to only said reference light signal.

4,047,035

BAGGAGE INSPECTION DEVICE

Manfred Dennhoven, Wiesbaden; Claus Kunze, Taunusstein, and Rainhard Kuehn, Wiesbaden, all of Germany, assignors to Heimann GmbH, Germany

Filed Jan. 6, 1976, Ser. No. 649,663
Claims priority, application Germany, July 18, 1975, 2532218
Int. Cl.[2] G01M *23/22*
U.S. Cl. 250—355 6 Claims



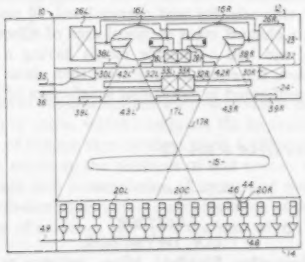
1. In a device for inspection of objects, particularly luggage and the like, by means of X-rays originating from an X-ray generator and penetrating the object being inspected to produce an image on a fluorescent screen, which image may be directly observable or, in combination with a television circuit, indirectly observable, the combination of an X-ray detector, a photo-conductive cell having an applied layer of X-ray sensitive luminescent material, said photo-conductive cell being disposed in the beam path of the X-ray generator directly at the beam outlet opening thereof, and means operatively connected to said X-ray detector and the high voltage circuit of the X-ray generator for switching off the high voltage generator in the event the intensity and/or duration of the emitted radiation at the detector exceeds a predetermined value.

4,047,036

STRIP PROFILE MEASUREMENT

Kenneth Browning Smith, Tuffley, and Derek William Adams, Cheltenham, both of England, assignors to Heath (Gloucester) Ltd., Gloucester, England

Filed Apr. 27, 1976, Ser. No. 680,558
Claims priority, application United Kingdom, May 10, 1975, 19743/75
Int. Cl.[2] G01N *23/16*
U.S. Cl. 250—359 13 Claims



1. A radiation gauge for measuring the profile of a strip travelling therethrough, comprising:

a single stationary radiation source disposed on one side of the strip for producing a beam of radiation in the form of a fan-shaped curtain intersecting said strip in a zone extending across at least part of the width of the strip substantially at right angles to its direction of travel;

a plurality of stationary radiation detectors disposed in a line on the other side of said strip, said detectors being spaced across at least part of the width of the strip corresponding to said irradiated zone and arranged to detect the fan-shaped beam of radiation from said single source which has passed through the strip in said single zone; and

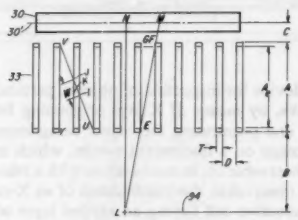
output signal means responsive to the detectors to produce respective output signals each representative of the thickness of the strip in a respective part of said zone.

4,047,037

GAMMA RAY CAMERA FOR NUCLEAR MEDICINE

Philip A. Schlosser, and John W. Steidley, both of Columbus, Ohio, assignors to The Ohio State University, Columbus, Ohio

Filed Feb. 9, 1976, Ser. No. 656,304
Int. Cl.² G01T 1/22
U.S. Cl. 250—370 **21 Claims**



1. In a gamma camera type device for deriving image defining information of the source distribution of gamma rays providing a photon energy level, E, of interest, said device including an orthogonal strip array semi-conductor for deriving spatial and energy level information corresponding with said distribution, said detector array of strips having a frequency *vs* and strip spacing, l, said device further including collimator means operatively associated with said detector and having an inwardly disposed plane defining side spaced from the mid-plane of said detector a distance, C, having an outwardly disposed plane defining side spaced from said inward side to define thickness, A, and spaced from said source a distance, B; the improvement wherein said collimator means comprises:

an array of adjacently disposed channels, having internal surfaces and disposed intermediate of said inward and outward sides, said array being configured to define a septal thickness, T, intermediate said channels, an effective collimator thickness, $A_E = A - [2/\mu(E)]$, and $\mu(E)$ is the attenuation coefficient of the surface defining material of said channels, for said energy level, *E*, said channels having a channel cross sectional area of effective diameter, D; and said collimator means having a collimator resolution, R_c, equal to or greater than about 1.7 (l) and being configured in substantial satisfaction of the expression:

$$R_c = (D/A_E)(A + B + C).$$

4,047,038

U.V. DETECTOR

Arlon D. Kompelien, Richfield, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed July 23, 1976, Ser. No. 708,142
Int. Cl.² G01J 1/42
U.S. Cl. 250—372 **2 Claims**

1. In combination:

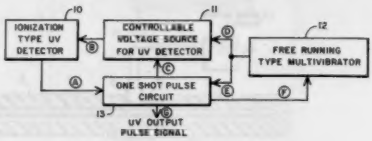
U.V. detector means of the ionization type;

controllable voltage source means having a pair of supply terminals connected for energizing said detector means, said supply terminals normally providing to said detector means a first polarity of potential;

second means in said controllable voltage source means for causing a reversal of polarity of the potential supplied at said pair of terminals;

free running oscillator means providing a first signal to said second means to cause temporary reversals of polarity at a predetermined rate;

a pulse output circuit from said U.V. detector means;


IONIZATION TYPE UV DETECTOR
CONTROLLABLE VOLTAGE SOURCE FOR UV DETECTOR
FREE RUNNING TYPE MULTIVIBRATOR
ONE SHOT PULSE CIRCUIT
UV OUTPUT PULSE SIGNAL

one-shot pulse circuit means connected to be triggered by said pulse output circuit, said one-shot means providing a second signal pulse to said second means each time it is triggered by a signal from said detector means to cause said reversal of polarity; and

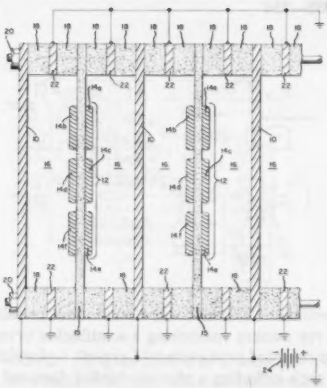
oscillator means turn-off means connected to stop said oscillator means when U.V. is being detected by said detector means.

4,047,039

TWO-DIMENSIONAL X-RAY DETECTOR ARRAY

John M. Houston, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 3, 1976, Ser. No. 692,287
Int. Cl.² G01T 1/18
U.S. Cl. 250—385 **18 Claims**



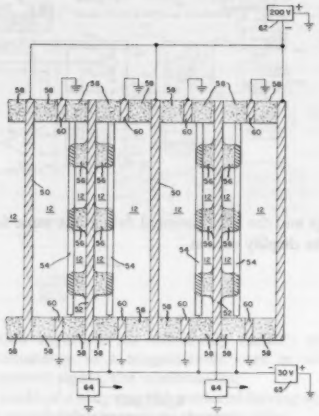
1. In an x-ray detector array of the type comprising a gaseous medium characterized as being substantially opaque to electromagnetic radiation at x-ray frequencies; a plurality of substantially planar cathodes disposed in said gaseous medium; a plurality of substantially planar anode assemblies disposed in said gaseous medium, each of said anode assemblies lying approximately equi-distant between two of said cathodes, and means for applying electric potential between said cathodes and said anode assemblies; the improvement wherein:

each of said anode assemblies comprises a plurality of parallel conductive strips disposed on one or more surfaces of a planar dielectric sheet, the long dimension of each of said strips being oriented substantially parallel to an incident x-ray beam.

4,047,040
GRIDDED IONIZATION CHAMBER

John M. Houston, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 6, 1976, Ser. No. 683,908
Int. Cl.² G01T 1/18
U.S. Cl. 250—385 10 Claims

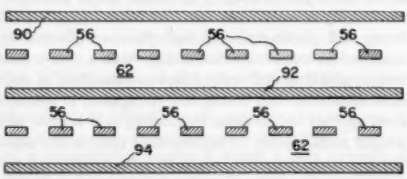


1. An ionization chamber x-ray detector comprising:
a substantially flat anode sheet;
a substantially flat cathode sheet disposed parallel said anode sheet;
a perforated insulating layer disposed on the surface of said anode sheet;
an open grid comprising a thin, perforated metal sheet disposed on said insulating layer, the perforations of said insulating layer and metallic sheet being aligned;
a gaseous detecting medium disposed between said cathode, said anode, and said grid;
means for maintaining an electrical potential between said anode and said cathode;
means for maintaining said grid at an electrical potential intermediate that of said anode and said cathode; and
means for measuring current flow from said anode to said cathode.

4,047,041
X-RAY DETECTOR ARRAY

John M. Houston, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 19, 1976, Ser. No. 678,074
Int. Cl.² G01T 1/18
U.S. Cl. 250—385 9 Claims

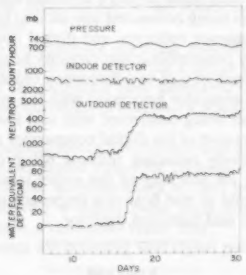


1. An ion chamber detector array for determining the distribution of x-ray intensities in one or more flat, coplanar, x-ray beams comprising:
a first flat anode sheet disposed in a plane lying parallel to the plane of said x-ray beams;
a second, flat anode sheet disposed parallel to said first anode sheet,
a third, flat anode sheet disposed parallel to and adjacent a side of said first anode sheet opposite said second anode sheet;
a first plurality of rod-like cathode elements disposed in said x-ray beam and equi-distant between said first anode sheet and said second anode sheet, a long dimension of said cathode elements being oriented in a direction substantially parallel to the angle of incidence of one or more of said x-ray beams;
a second plurality of rod-like cathode elements disposed in said x-ray beam and equi-distant between said first anode sheet and said third anode sheet, a long dimension of said cathode elements being oriented in a direction substantially parallel to the angle of incidence of one or more of said x-ray beams;
a gaseous detecting medium disposed between said first anode sheet, and second anode sheet, said third anode sheet, and said cathodes;
means for applying an electric potential between said cathodes and said anodes, whereby an electric field is impressed between said cathodes and said anodes, and for connecting each of said cathodes to a signal processing circuit.

4,047,042
METHOD OF DETERMINING THE WATER EQUIVALENT DEPTH OF SNOWFALL USING NEUTRONS OF COSMIC RAYS

Masami Wada, Higashikurume; Masahiro Kodama, Kita, and Shinkichi Kawasaki, Yokohama, all of Japan, assignors to Rikagaku Kenkyusho, Japan

Filed June 12, 1975, Ser. No. 586,510
Claims priority, application Japan, June 15, 1974, 49-68397
Int. Cl.² G01T 3/00
U.S. Cl. 250—390 1 Claim



1. A method of determining the water-equivalent depth of an accumulation of snow, which comprises the steps of counting the neutrons of cosmic rays incident upon a given accumulation of snow, counting the neutrons of said cosmic rays after passing through said accumulation of snow, and determining the water-equivalent depth of said accumulation of snow from said countings of neutrons and upon the basis of the formula:

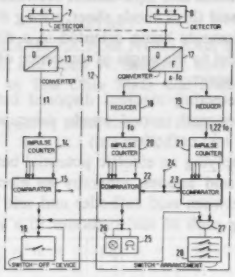
$$W = \frac{[\ln N_o - \ln N_t}{b},$$

wherein N_o is the count of neutrons of the cosmic rays incident upon said snow, N_t is the count of neutrons of the cosmic rays after passing through said snow, b is an absorption factor within the range $0.01/gcm^{-2}$ to $0.02/gcm^{-2}$, and W is the water-equivalent depth, in cm., of said accumulation of snow.

4,047,043
IRRADIATION INSTALLATION FOR IONIZING RADIATION

Rudolf Meyer, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 26, 1976, Ser. No. 652,577
Claims priority, application Germany, June 12, 1975, 2526294
Int. Cl.[2] G01T 1/00
U.S. Cl. 250—401 5 Claims



1. In an irradiation installation for ionizing radiation, including at least one radiation detector exposed to the radiation; a first radiation monitor for presetting of the radiation dosage to be currently applied and for the limiting thereof to a currently preset reference value; a presettable integrating unit connected to said radiation detector; and automatic switch-off means for said installation activated by said integrating unit responsive to reaching of said preset radiation dosage, the improvement comprising: a second control radiation monitor for surveilling the plus and minus tolerance of said first radiation monitor, said second radiation monitor including a dose rate frequency converter for converting the signals of said radiation detector into a frequency proportional to the dose rate, two differing frequency reducers being connected to the output of said dose rate frequency converter, said reducers having reduction ratios deviating from each other within a tolerable error band width, impulse counters being connected one each to respectively one of said two frequency reducers, and digital comparators having a commonly presettable count capacity being connected to the outputs of each of said two frequency reducers, the output of the digital comparator associated with the more extensively reducing reducer being connected with said automatic switch-off means, the output of the digital comparator associated with the less extensively reducing reducer being connected to a main protector for blocking of the entire irradiation installation, and the input of said dose rate frequency converter being connected with said radiation detector.

4,047,044
ANODE HEAT MONITORING MEANS

Kenneth E. Weaver, Stamford, Conn., assignor to The Machlett Laboratories, Inc., Stamford, Conn.

Filed June 1, 1976, Ser. No. 691,945
Int. Cl.[2] H05G 1/28
U.S. Cl. 250—402 5 Claims

1. A radiographic system for displaying a visible image of an irradiated subject and comprising:

an x-ray source disposed to direct an x-ray beam through the subject and produce a corresponding x-ray image thereof;

imaging means interceptingly disposed in the path of the x-ray beam for receiving the x-ray image and producing a corresponding visible image;

sensing means disposed to receive informational data concerning the x-ray source and produce equivalent electrical signals; and

display means comprising a television monitor with a display screen and a television camera unit disposed to receive the visible image, said monitor being electrically coupled the camera unit and the sensing means for showing the visible

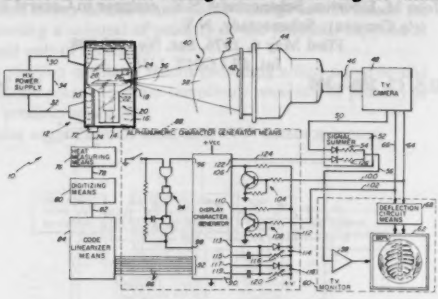
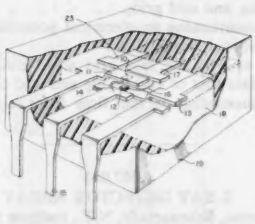


image and the informational data in the same field of view on the display screen.

4,047,045
OPTICAL COUPLER

Grady W. Paxton, Jr., P.O. Box 227, Allen, Tex. 75002; Bobby W. Howeth, 103 S. Lindale; Edward W. Mehal, 1110 Hamilton, both of Richardson, Tex. 75080; William F. Cashion, 5638 Anita St., Dallas, Tex. 75206, and Charles M. Cashion, 103 Wake, Richardson, Tex. 75080

Continuation-in-part of Ser. No. 554,968, March 3, 1975, abandoned. This application July 1, 1976, Ser. No. 701,895
Int. Cl.[2] G02B 27/00
U.S. Cl. 250—551 15 Claims



1. Apparatus comprising:

a. a photo-emissive body mounted on a first beam,

b. a photo-responsive body mounted on a second beam electrically isolated from said first beam and spaced therefrom, said photo-emissive and photo-responsive bodies mounted in opposed relationship with a space therebetween, said first and second beams extending in opposite directions from said bodies and juxtaposed in spaced relationship only in the areas supporting said bodies, and

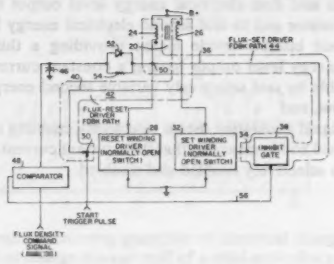
c. a rigid unitary body of substantially electrically non-conductive transfer molded material substantially transparent to the operative wavelengths of said photo-emissive and photo-responsive bodies formed in the space between said bodies and extending outwardly from said bodies and surrounding sufficient portions of said beams to provide structural rigidity to said apparatus and maintain the separation between said bodies, thereby avoiding the formation of any interface extending substantially parallel with the optical path between said photo-emissive body and said photo-responsive body.

4,047,046

CIRCUIT FOR SETTING MAGNETIC REMANENCE IN A MAGNETIZABLE CORE

Walter E. Milberger, Severna Park, and Gerald I. Klein, Baltimore, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 6, 1976, Ser. No. 646,790
Int. Cl.[2] H01F *13/00*
U.S. Cl. 307—101 10 Claims



1. In circuit apparatus for selectively variably setting the magnetic remanence in a magnetizable core in accordance with a set control signal, the combination:

a. a core made of a magnetizable material having an approximately rectangular hysteresis characteristic,

b. a voltage source providing a potential between a pair of output terminals,

c. a pair of windings wound about and inductively coupled to said core, said pair of windings comprising a reset winding and a set winding, each of said pair of windings having an operating potential end and an induced regenerative signal end, the operating potential ends of both the reset and set windings being commonly connected to one of the output terminals of the voltage supply, the construction and arrangement being such that a current through the reset winding will induce into the set winding a voltage signal which at the feedback end of the set winding bears a regenerative feedback relationship to said current through the reset winding, and such that a current through the set winding will induce into the reset winding a voltage signal which at the feedback end of the reset winding bears a regenerative feedback relationship to said current through the set winding,

d. a normally open reset winding switch device for operatively connecting the other terminal of the voltage source with the feedback end of the reset winding, said reset winding switch device having a control input connected to the feedback end of the set winding, said reset winding switch device being operative to change to its closed circuit condition in response to the application to its control input of a voltage of the polarity of a regenerative feedback signal which appears at the feedback end of the set winding.

e. a normally open set winding switch device for operatively connecting the other terminal of the voltage source with the feedback end of the set winding, said set winding switch having a control input and being operative to change to its closed circuit condition in response to the application to its control input of a voltage of the polarity of a regenerative feedback signal which appears at the feedback end of the set winding, said control input of the set winding switch device being connected to the regenerative feedback end of the reset winding whereby the collapsing flux associated with the reset winding following saturation of the core causes a voltage to be generated at the feedback end of the reset winding to actuate the set switch in its closed circuit condition, and

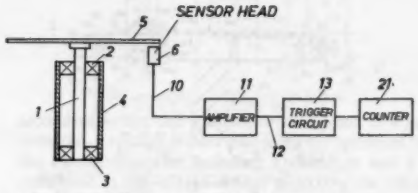
f. signal inhibit means responsive to the set control signal and to the flow of current in set winding, said signal inhibit means being operative to terminate the application of the regenerative feedback signal from the feedback end of the reset winding to the control input of the set winding set device when the magnetization imparted to the core by flow of current through the set winding reaches a magnitude corresponding to the remanent magnetization called for by the set control signal.

4,047,047

PULSE GENERATOR

Mogens Bredal Boysen, Copenhagen, Denmark, assignor to 4K - International A/S, Copenhagen, Denmark

Filed June 14, 1974, Ser. No. 479,497
Int. Cl.[2] H03K *3/00*
U.S. Cl. 307—106 8 Claims



1. A pulse generator for measuring the rotational angle of a rotatably supported shaft member comprising:

a. a driven member including a magnetizable endless track forming an integral, direct surface portion of said driven member;

b. recorded signal means carried on said endless track; said recorded signal means being formed of a plurality of recorded sinusoidal signals distributed along said endless track; said sinusoidal signals being constituted by different states of magnetization of the different locations on said endless track;

c. means connecting said driven member to said shaft member for moving said driven member by said shaft member to an extent proportional to the rotational angle of said shaft member;

d. means for continuously scanning successive locations of said endless track for generating a signal as a function of the flux of the magnetic field generated by the different states of magnetization of successive points on said endless track;

e. signal processing means for continuously and successively sensing the generated signal for forming a voltage signal having a course corresponding to said generated signal and for emitting a signal pulse each time said voltage signal exceeds a threshold value; and

f. counter means for counting said signal pulses.

4,047,048

MASTER CYLINDER WITH COMBINED RESERVOIR COVER, SEAL AND FLUID LEVEL SENSOR ASSEMBLY

Michael Demido, Troy, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 12, 1976, Ser. No. 675,742
Int. Cl.[2] H01H *35/18*
U.S. Cl. 307—118 3 Claims

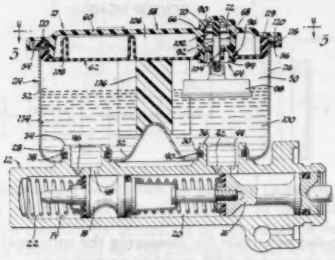
1. For use with a fluid reservoir adapted to contain a fluid sealed from atmosphere and defining a fluid level adapted to be sensed without breaking the seal, the reservoir being defined by a housing having a continuous upper edge surface:

a combined reservoir cover and seal and fluid level sensor assembly comprising:

a molded cover having a channel on one side thereof defined by a bottom surface adapted to align with the reservoir housing upper edge surface and spaced inner and outer side walls adapted to receive the housing upper edge

surface therebetween, a generally cylindrical sensor mounting hub adapted to be positioned over the reservoir when the edge surface is received in said channel above a portion of the reservoir where the fluid level is to be sensed, and electrical conduits leading from said hub within said cover to a connector integrally formed as a part of said cover and adapted to receive a wiring harness connecting the sensor to a signal circuit;

said sensor having switch means mounted in said hub in electrical communication with said electrical conduits and float means extending below the cover and supported by said hub, said float means being adapted to extend into the reservoir for floating with respect to the fluid level therein to close said switch means to energize the signal circuit when the fluid level decreases to a predetermined point;



and a seal comprising a convoluted diaphragm spaced from said cover to form a cavity therebetween, said seal having an end wall positioned in said channel with one side thereof in sealing engagement with said channel inner side wall and adapted with the opposite side thereof to sealingly engage the reservoir housing adjacent the upper edge surface thereof to seal contained fluid from atmosphere, said float means extending through an aperture in said diaphragm, a guide in said aperture having means for venting between the reservoir and the portion of said hub containing said switch means, and vent means venting said cavity to displace air therethrough in response to changes in said fluid level;

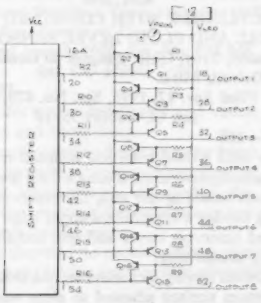
and means for removably retaining said cover and said seal on the reservoir.

4,047,049

DRIVE CIRCUIT WITH CONSTANT CURRENT OUTPUT

Fred William Erickson, Woodland Hills, and Roy Hiroshi Nakahara, Sun Valley, both of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Oct. 28, 1975, Ser. No. 626,250
Int. Cl.² H02J 9/02
U.S. Cl. 307—157 **10 Claims**



1. A constant current drive circuit comprising:

a. first electrical energy source means supplying a first electrical energy level output,

b. second electrical energy source means responsive to said first electrical energy level output and supplying a selectively variable second energy level output,

c. a resistor connected in electrical series with said first electrical energy source means and responsive to said first electrical energy level output,

d. bistable control means including triode means responsive to said first electrical energy level output through said resistor and to said second electrical energy level output, said bistable triode means providing a third electrical energy level output having a constant current determinable by said selectively variable second energy level output, and

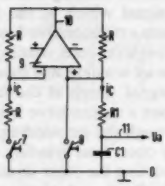
e. signal generating means selectively enabling and disabling said triode means so that the constant current drive circuit is selectively enabled and disabled.

4,047,050

CALIBRATING IMPULSE GENERATOR FOR AN IMPULSE-SHAPING ELEMENT

Estan Laurent, Lidingo, Sweden, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 21, 1975, Ser. No. 624,559
Claims priority, application Germany, Nov. 7, 1974, 2452933
Int. Cl.² H05K 3/00
U.S. Cl. 307—108 **3 Claims**



1. A calibrating impulse generator including a signal-shaping element having an input for receiving an input signal $f(t)$ and being operative for reshaping the input signal pursuant to a function represented by the quotient of the derivative with respect to time of the input signal, and the input signal, the quotient thus being expressed:

$$\left(\frac{df(t)}{dt} / f(t)\right),$$

the improvement comprising said calibrating inpulse generator having a calibrating impulse generating circuit with an output connected to the input of said signal-shaping element, said calibrating impulse generating circuit having a construction for supplying a calibrating impulse to said output which proceeds from an initial value pursuant to an *e*-function over a period of time to a final value and after reaching the final value returns again to its initial value, said calibrating impulse returning from said final value to its initial value pursuant to an *e*-function which is a mirror-image to the *e*-function pursuant to which said signal proceeds from its initial value to its final value.

4,047,051

METHOD AND APPARATUS FOR REPLICATING A CHARGE PACKET

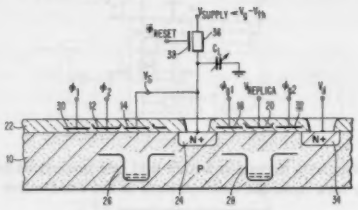
Lawrence Griffith Heller, Brewster, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,425

The portion of the term of this patent subsequent to Aug. 23, 1994, has been disclaimed.

Int. Cl.² G11C *19/28;* H01L *29/78*

U.S. Cl. 307—221 D 3 Claims



1. A circuit for entering quantities of electrical charge carriers into a first charge storage well of a solid-state charge-transfer-device of the type having a semiconductor substrate and a plurality of charge transfer means for moving quantities of electrical charge carriers in a controlled manner across said substrate, said circuit comprising:

a source diffusion means located on said semiconductor substrate and producing an inherent depletion capacitance C_ϕ

an input lead connected to said source diffusion means,

an active device connected between a supply voltage and said input lead, said active device being controlled by a source of reset signal to couple said supply voltage to said source diffusion to raise the potential of said source diffusion to equal a predetermined first precharge potential,

a second charge storage well containing a quantity of original charge Q for providing a voltage ΔV which is applied and coupled to said input lead to vary the potential of said source diffusion for producing and inserting into said first charge storage well of said charge-transfer-device a quantity of charge carriers Q directly proportional to said voltage ΔV and independent of said depletion capacitance C_ϕ

and an electrical charge drain means located on said semiconductor substrate to remove charge carriers produced by said diffusion when said source diffusion is equal to said predetermined first precharge potential.

4,047,052

CIRCUIT ARRANGEMENT FOR REGULATING THE AMPLITUDE OF A SAWTOOTH GENERATOR

Michael Koubek, Munich, and Dietmar Mallon, Zorneding, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 16, 1976, Ser. No. 667,516

Claims priority, application Germany, Mar. 17, 1975, 2511642

Int. Cl.² H03K *4/08*

U.S. Cl. 307—228 1 Claim

1. An arrangement for regulating the amplitude of a sawtooth wave, comprising:

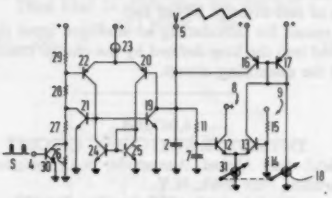
a first capacitor connected to a current source;

a switch connected to said first capacitor and operated to periodically charge and discharge said first capacitor to form the sawtooth wave, said switch including an input for receiving and being controlled by synchronizing pulses; and

a regulating circuit including a second capacitor connected to circuit with said first capacitor and having the mean value of the sawtooth wave, a comparator for comparing the mean value with a reference value, and means connected to said comparator and to said first capacitor for controlling the charging of said first capacitor in dependence upon the comparison to maintain the mean value equal to the reference value,

said comparator comprising a differential amplifier and a constant current source connected to said differential amplifier, and comprising a current reflector connected to said differential amplifier and to said first capacitor,

said differential amplifier comprising a pair of emitter-coupled transistors, and constant current source connected between said coupled emitters and a reference potential, a first of said transistors including a base connected to said



second capacitor and a collector connected to a supply potential, a voltage divider providing the reference value, the second transistor including a collector, and a base connected to the voltage divider to receive the reference potential, and third and fourth base-coupled transistors each having a collector, and an emitter connected to the supply potential, said coupled bases connected to said collectors of said second and third transistors, and said collector of said fourth transistor connected to said first capacitor.

4,047,053

ANALOGUE STORAGE CIRCUIT INCLUDING CHARGE TRANSFER DEVICE WITH COMPENSATION LOOP

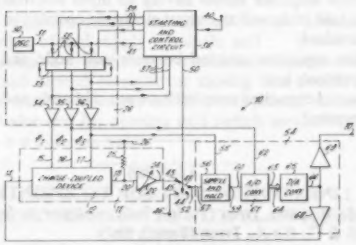
Anthony John Ley, New Canaan, Conn., and Eric Metcalf, Ropley, England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed Aug. 6, 1975, Ser. No. 602,161

Claims priority, application United Kingdom, Aug. 10, 1974, 35328/74; Sept. 7, 1974, 39186/74

Int. Cl.² H01L *27/10*

U.S. Cl. 307—238 23 Claims



1. An analogue storage circuit comprising:

a charge transfer device having an input whereby an analogue signal may be introduced into the device, an output, and means whereby the analogue signal may be shifted from the input to the output, the analogue signal being subject to a change in magnitude during said shifting;

a quantising circuit for receiving the analogue signal from the output of the charge transfer device and for quantising the received analogue signal at a respective one of a plurality of substantially discrete levels, the particular level at which said signal is quantised being one of two of the discrete levels between which the magnitude of the received analogue signal lies, the particular level being the

one nearest to the magnitude of the received analogue signal, the separation of each pair of adjacent discrete levels being not less than twice the magnitude of said change in analogue signals whose magnitude lies between that pair of levels, the quantising circuit being arranged to apply the quantised analogue signal to the input of the charge transfer device, whereby in operation the analogue signal is circulated round the loop defined by the charge transfer device and the quantising circuit, the quantising circuit being further arranged to quantise the analogue signal, upon each subsequent receipt thereof, at the same one of said discrete levels; and

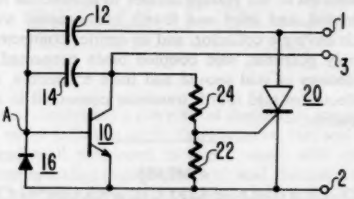
input means for introducing an analogue input signal to be stored into the loop defined by the charge transfer device and the quantising circuit.

4,047,054

THYRISTOR SWITCHING CIRCUIT

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,537
Int. Cl.² H03K *17/72*
U.S. Cl. 307—252 J **2 Claims**



1. A switching circuit comprising, in combination:

first and second terminals for receiving a signal thereacross to be switched and a third terminal for receiving a trigger signal;

a thyristor having a main conduction path coupled between said first and second terminals and having also a gate electrode;

means coupling said gate electrode to said third terminal;

a node;

current amplifier means having an input electrode coupled to said node and an output electrode coupled to said third terminal;

a first capacitor coupled between said node and said first terminal; and

a second capacitor coupled between said node and said third terminal.

4,047,055

LINE CONTROL UNIT FOR TELEPRINTERS

Antonio Romano, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Nov. 18, 1975, Ser. No. 632,909
Claims priority, application Italy, Dec. 24, 1974, 70739/74
Int. Cl.² H03K *5/01*
U.S. Cl. 307—262 **2 Claims**

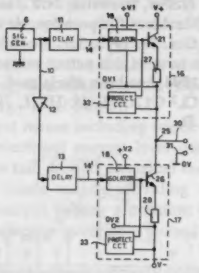
1. Line control unit for teleprinters for a double-current line, comprising:

a circuit for generating switching signals,

a first pair of line transistors connected to a source of positive and negative voltages, respectively, and furthermore interconnected at a point common to the said line to supply selectively on said line a positive and negative current, respectively,

a pair of isolating circuits disposed between said line transistors and said generating circuit for galvanically isolating said line from said generating circuit,

a pair of delay circuits arranged between said generating circuit and said isolating circuits, for delaying the edges of



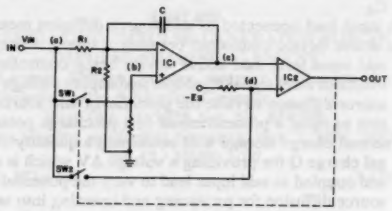
the switching signals at which said line transistors respectively turn from the blocked state to the conductive state.

4,047,056

VOLTAGE-FREQUENCY CONVERTER

Kazuyoshi Nakagawa, Yokohama, Japan, assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 2, 1976, Ser. No. 737,989
Int. Cl.² H03K *1/16*
U.S. Cl. 307—271 **3 Claims**



1. A voltage-to-frequency converter comprising

an integrator having an inverting input terminal and a non-inverting input terminal,

an input signal terminal,

circuit means connecting said input signal terminal to said inverting input terminal,

first switch means connecting said input signal terminal to said non-inverting input terminal,

a signal comparator having an inverting input terminal and a non-inverting input terminal,

circuit means connecting an output of said integrator to said inverting input of said comparator,

reference signal means connected to said non-inverting input of said comparator,

second switch means connecting said input signal terminal to said non-inverting input of said comparator and

means connecting an output of said comparator to said first and second switch means to concurrently operate said first and second switch means.

4,047,057

MONOSTABLE SWITCHING CIRCUIT

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

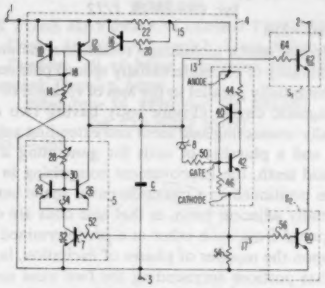
Filed Aug. 23, 1976, Ser. No. 716,538
Int. Cl.² H03K *3/02, 5/04*
U.S. Cl. 307—273 **16 Claims**

1. A circuit, for producing a momentary output signal manifestation in response to a change in an input signal from a first level to a second level; said circuit comprising:

current source means having first and second input terminals for receiving said input signal thereacross, an output ter-

minal responsive to said input signal when it is at said second level for producing an output current, and first and second control terminals for controlling the sense of said output current in accordance with the magnitude of a control current conducted between said control terminals, said control current having first and second magnitudes;

normally open switch means connected between said first and second control terminals for conducting said control current therebetween when closed and for blocking the flow of said control current when open, said switch means



including a trigger terminal responsive to a trigger signal supplied thereto for closing said switch and means for maintaining said switch closed once triggered; and

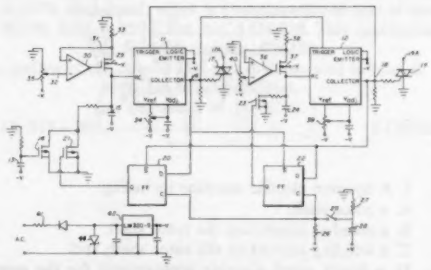
means for applying a trigger signal to said trigger terminal of said normally open switch means, said means including a circuit reference potential point, a capacitor connected between said reference potential point and said output terminal of said current source and a threshold conduction device connected between said output terminal and said trigger terminal.

4,047,058

ALTERNATING CONTROLLER COMPRISING PAIR OF MUTUALLY EXCLUSIVELY-OPERATED TIMERS

Aaron F. Green, One Holbrook Court, Rockport, Mass. 01966

Filed May 21, 1976, Ser. No. 688,906
Int. Cl.² H03K *5/13, 17/00*
U.S. Cl. 307—293 **18 Claims**



1. An electronic controller for controlling the power applied to at least one load comprising;

first and second timers each having a trigger input, a timing input and an output,

means coupling the output of the first timer and trigger input of the second timer, and the output of the second timer and trigger input of the first timer to provide dependent operation between timers,

a pair of electronic switches coupling, respectively, from the output of the first and second timers to the load,

first and second charging circuits coupled to the timing input of the first and second timers, respectively, for providing a predetermined time interval of operation of each timer, and

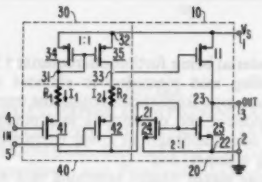
timer selection means including manual switch means coupled to the timing input of at least one of said timers for changing the state thereof.

4,047,059

COMPARATOR CIRCUIT

Bruce David Rosenthal, Highland Park, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,267
Int. Cl.² H03K *5/20*
U.S. Cl. 307—355 **10 Claims**



1. A comparator, for producing an output signal dependent upon both the ratio of the magnitudes and the sum of the magnitudes of first and second input signals to be compared, comprising, in combination:

two supply terminals for receiving an operating voltage thereacross and a circuit output terminal for providing said output signal thereat;

input means for conducting first and second currents between said supply terminals and for independently controlling the magnitudes thereof in accordance with the magnitudes of said first and second input signals, respectively;

controlled conduction means coupled between one of said supply terminals and said circuit output terminal for conducting a current therebetween proportional to a control signal;

means for summing said first and second currents to obtain said control signal, whereby said current conducted by said controlled conduction means varies in proportion to the sum of the magnitudes of said first and second input signals;

switch means connected between said output terminal and the other of said supply terminals; and

means coupled to said switch means and responsive to said first and second currents for closing said switch means when the ratio between said first and second currents is a first value and for opening said switch means when said ratio is a different value.

4,047,060

ACOUSTIC TRANSDUCER WITH ELASTOMERIC COUPLING

Hugo Willy Schafft, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 178,102, Sept. 7, 1971, abandoned, and Ser. No. 405,208, Oct. 10, 1973, abandoned, and Ser. No. 532,114, Dec. 12, 1973, abandoned. This application Feb. 5, 1976, Ser. No. 655,367
Int. Cl.² H01L *41/04*
U.S. Cl. 310—322 **3 Claims**

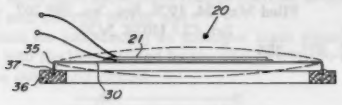
1. A piezoelectric acoustic transducer comprising:

a. a generally circular, disc shaped piezoelectric element having opposed major surfaces with electrodes affixed thereto;

b. a generally circular diaphragm formed of piezoelectrically inactive material having a different thermal coefficient of expansion from said piezoelectric element, said

diaphragm having opposed major surfaces one of which defines an area at least coextensive with one of the major surfaces of said piezoelectric element;

c. an elastomeric interlayer having one surface affixed to said one major surface of said piezoelectric element and an opposed surface affixed to said one coextensive major surface of said diaphragm, said elastomeric interlayer being formed of material having a shear modulus which varies directly with the frequency of stress applied thereto



and said material being further characterized by mechanically coupling said piezoelectric element to said diaphragm at acoustic frequencies within the operating range of the transducer and decoupling said piezoelectric element from said diaphragm at lower frequencies;

d. a mounting member; and

e. flexible hinge means fixedly attaching said diaphragm to said mounting member for axial flexing movements at an acoustic rate.

4,047,061

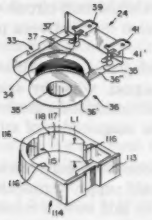
COIL PROTECTOR FOR PERMANENT MAGNET SYNCHRONOUS MOTOR

Bill G. Kilmer, Indianapolis, and David F. Baugh, Jr., Greenwood, both of Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 342,204, March 6, 1973, abandoned. This application July 3, 1974, Ser. No. 485,396

Int. Cl.[2] H02K *19/00*

U.S. Cl. 310—164 **1 Claim**



1. An electric motor construction comprising:

a. a field structure;

b. an energizing winding comprising a wire wound bobbin comprising a spindle, a coil of wire surrounding the spindle, said spindle carrying in substantially spaced relation a resilient flange and a terminal-retaining flange, ends of said wire being connected to two terminals in said terminal retaining flange;

c. a permanent magnet rotor; and

d. a coil protector comprising:

1. a substantailly-flat housing having a hole passing through it substantially the same size and shape as said resilient flange of said coil bobbin and of sufficient depth to envelop the outer periphery of said coil, and

2. a plurality of ribs projecting from an inside wall of said hole in toward the center, each having a length in a direction substantially parallel to the axis of said spindle about equal to the inside length of said spindle from said resilient flange to said terminal-retaining flange, whereby said coil protector is pressed down against said resilient flange, to force said projections over said resilient flange and snap them into place between said resilient flange and said terminal-retaining flange thereby entraping said coil protector to said wire-wound bobbin.

4,047,062

ROTATING ELECTRICAL MACHINE

Ludwig Ludin, Kesselackerweg, CH-5611 Anglikon-Wohlen, Switzerland, and Nikolaus Laing, Hofener Weg 35-37, D-7141 Aldingen near Stuttgart, Germany

Continuation of Ser. No. 419,216, Nov. 26, 1973, abandoned. This application Aug. 7, 1975, Ser. No. 602,671

Claims priority, application Austria, Nov. 28, 1972, 10108/72

Int. Cl.[2] H02K *1/12*

U.S. Cl. 310—216 **16 Claims**

1. An electric motor including a rotatable armature, a stator having a plurality of circumferentially spaced pole teeth which extend substantially parallel to the axis of rotation of the armature, a magnetic circuit closure body having two axial ends magnetically connecting said teeth and extending axially along said axis, and a plurality of coils for generating a magnetic force in said teeth, the improvement comprising in that each said coil is positioned in a circumferential space between circumferentially adjacent teeth, in that said coils are circumferentially spaced from each other at a predetermined angle dependent upon the number of phases of excitation, in that each said coil has portions surrounding the two axial ends of said magnetic circuit closure body in radially extending planes and portions surrounding the circumferential surface of said magnetic closure body in axially extending planes and in that said pole teeth comprise strips arranged in radially extending planes.

4,047,063

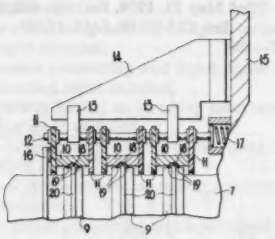
LIQUID METAL SLIP-RING ARRANGEMENT FOR A DYNAMO ELECTRIC MACHINE

Albert Benjamin John Reece, Stafford, and Anthony John Walkden, Watford, both of England, assignors to The General Electric Company Limited, London, England

Continuation of Ser. No. 532,916, Dec. 16, 1974. This application Apr. 9, 1976, Ser. No. 675,481

Int. Cl.[2] H01R *39/08*

U.S. Cl. 310—232 **7 Claims**



1. A dynamo electric machine including:

A. a rotor shaft;

B. a member supporting the rotor shaft;

C. a winding carried on the rotor shaft; and

D. a liquid metal slip-ring arrangement for the supply of current to or from said winding, said slip-ring arrangement comprising:

I. a first electrically conductive annular member which is coaxial with said rotor and rotates therewith and which is electrically connected with said winding;

II. a second electrically conductive annular member;

III. support means connected between said second annular member and said member supporting the rotor shaft so as to support said second annular member coaxially with said first annular member and to provide an annular gap between said first and said second annular members, and to

hold said second annular member non-rotating while permitting axial movement thereof;

IV. coupling means connected at one end to said second annular member and at its other end to the rotor shaft to cause said second annular member to move axially with said first annular member during axial movement of the rotor shaft; and

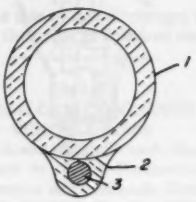
V. a supply of liquid metal in said annular gap between said first and said second annular members whereby electrical connection between said members is established.

4,047,064

FLASH TUBE HAVING ENCLOSED TRIGGER WIRE

Robert J. Cosco, Amesbury; Joseph V. Lima, Salem, and Frank Soucy, Danvers, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed June 16, 1976, Ser. No. 696,667
Int. Cl.[2] H01J *65/00*
U.S. Cl. 313—201 **2 Claims**



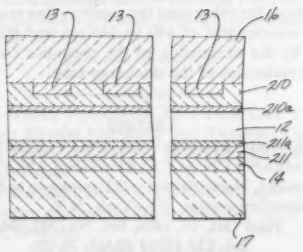
1. In a flash tube having an hermetically sealed glass envelope containing an inert gas and a pair of electrodes between which an arc discharge path is defined during lamp operation, the improvement which comprises a tungsten trigger wire embedded within a glass tube which is fused to the outer surface of the envelope, the coefficient of expansion of the glass tube being intermediate that of the tungsten trigger wire and that of the glass envelope.

4,047,065

GAS DIELECTRIC OVERCOAT FOR PANEL

Roger E. Ernsthausen, Lucky, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 406,022, Oct. 12, 1973, Pat. No. 3,943,394, which is a continuation-in-part of Ser. No. 204,700, Dec. 3, 1971, abandoned, which is a continuation-in-part of Ser. No. 70,745, Sept. 8, 1970, Pat. No. 3,634,719. This application Dec. 9, 1975, Ser. No. 639,150
The portion of the term of this patent subsequent to Mar. 9, 1993, has been disclaimed.
Int. Cl.[2] H01J *65/00, 61/02*
U.S. Cl. 313—201 **6 Claims**



1. In a gas discharge display/memory device characterized by an ionizable gas medium in a gas chamber formed by a pair of opposed dielectric material charge storage members having surfaces in contact with the gas medium and at least one electrode insulated from the gas medium by a dielectric member,

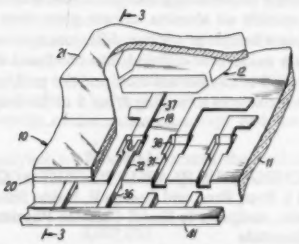
the improvement wherein each dielectric gas contacting surface is at least partially coated with a layer of at least one inorganic lead compound selected from the group consisting of lead selenide, lead sulfide, and lead telluride, said lead compound layer having a thickness of at least about 100 angstrom units.

4,047,066

FLAT DISPLAY PANEL COMPRISING AN ENVELOPE INCLUDING A SUBSTRATE HAVING TERMINAL-RECEIVING GROOVES

Masaki Kobayakawa, and Fumitake Akahane, both of Kagoshima, Japan, assignors to Nippon Electric Kagoshima, Limited, Kagoshima, Japan

Filed Feb. 25, 1976, Ser. No. 661,447
Claims priority, application Japan, Feb. 27, 1975, 50-24789
Int. Cl.[2] H01J *61/06*
U.S. Cl. 313—217 **8 Claims**



1. In a flat display panel including a hermetically sealed envelope and being for use together with an external circuit disposed externally of said envelope for energizing said display panel,

said display panel comprising a planar substrate formed of an insulating material as a part of said envelope and having an internal surface, a plurality of electrodes inside said envelope, and connection means for connecting said electrodes to said external circuit,

said connection means comprising a plurality of conductive end pieces fixedly attached to said substrate and connected to predetermined ones of said electrodes, a plurality of elongated terminals conductively attached to said end pieces and extended outwardly of said envelope for connection to said external circuit, and fixing means fixing said terminals to said substrate at predetermined portions of the respective terminals,

the improvement wherein:

each of said terminals comprises an internal conductor and a conductive lead; and

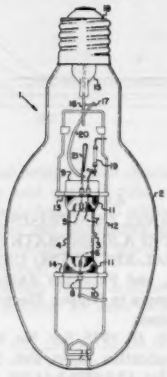
said substrate is provided with a plurality of grooves substantially snugly receiving the respective conductive leads and having openings, respectively, on said internal surface, said internal conductors extending on said internal surface from said conductive end pieces into said grooves through the respective openings, said conductive leads including said predetermined portions.

4,047,067

SODIUM HALIDE DISCHARGE LAMP WITH AN ALUMINA SILICATE BARRIER ZONE IN FUSED SILICA ENVELOPE

Edward M. Clausen, Eastlake, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed June 5, 1974, Ser. No. 476,726
Int. Cl.[2] H01J *61/35*
U.S. Cl. 313—221 1 Claim



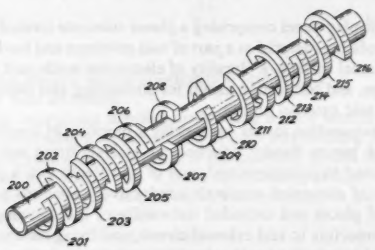
1. A metal halide lamp comprising a fused silica envelope containing a fill including sodium halide, said envelope having on the outside an alumina silicate glass zone at the surface serving as a barrier to sodium diffusion, said zone comprising aluminum oxide heat-diffused into the fused silica, said zone being from 5 to 25 microns thick and the peak concentration of aluminum oxide in it ranging from 5 to 25 weight percent.

4,047,068

SYNCHRONOUS PLASMA PACKET ACCELERATOR

Thomas I. Ress, Brea, and George V. Nolde, Santa Monica, both of Calif., assignors to Kreidl Chemico Physical K.G., Schaan, Liechtenstein

Division of Ser. No. 418,857, Nov. 26, 1973. This application Feb. 17, 1976, Ser. No. 658,729
Int. Cl.[2] H05H *7/04, 11/00*
U.S. Cl. 313—359 26 Claims



1. An accelerator for charged particles, comprising:

a vessel adapted to enclose a stream of charged particles along a preselected open-ended track; and

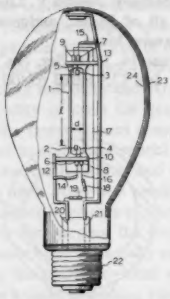
drive means juxtaposed with said vessel for generating therein a magnetic field traveling in a pre-selected direction relative to each point of said track with the magnetic flux vector of said field transverse to said track at all points, thereby setting said particles in motion along said track with a velocity having a predetermined relation to the velocity of said traveling field.

4,047,069

HIGH-PRESSURE MERCURY-VAPOR LAMP HAVING A PLURAL PHOSPHOR COATING

Hidezo Akutsu, Hyogo; Katsuaki Iwama, Osaka; Naoki Saito, Osaka; Masanori Takagawa, Osaka; Yoshichika Kobayashi, Osaka, and Tamisuke Atsumi, Kobe, all of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed June 20, 1975, Ser. No. 588,951
Claims priority, application Japan, June 21, 1974, 49-71542; June 21, 1974, 49-71543; June 21, 1974, 49-71544; June 21, 1974, 49-71546
Int. Cl.[2] H01J *1/62*
U.S. Cl. 313—487 2 Claims



1. A high-pressure mercury-vapor lamp comprising a discharge tube including electrodes sealed at both ends thereof, mercury and rare gas in said discharge tube, and an outer bulb around said discharge tube having a phosphor coating on the inside surface thereof, the phosphor coating being constituted by (a) a phosphor having emission peaks within the range of wavelengths between 440 and 540 nm and being at least one phosphor taken from the group consisting of strontium chloroapatite activated with di-valent europium, barium magnesium aluminate activated with di-valent europium strontium chlorosilicate activated with di-valent europium, barium magnesium aluminate activated with di-valent europium, and barium strontium silicate activated with di-valent europium, and (b) yttrium vanaphosphate activated with tri-valent europium and having emission peaks within the range of wavelengths between 600 and 720 nm, and the following conditions are satisfied:

$$0.50 \leqq P_{577\text{-}579}/P_{546} \leqq 1.0$$

$$0.3 \leqq P_{440\text{-}540}/P_{577\text{-}579} \leqq 1.2$$

$$0.1 \leqq P_{440\text{-}540}/P_{600\text{-}720} \leqq 1.0$$

where $P_{577\text{-}579}$ and P_{546} are the relative energy outputs of the mercury spectrum at wavelengths of 577–579 nm and a wavelength of 546 nm, and $P_{440\text{-}540}$ and $P_{600\text{-}720}$ are the relative total energy outputs for other than the mercury line spectrum in the ranges of wavelengths of 440 to 540 nm and 600 to 720 nm produced by the stimulation of the phosphor coating by the ultraviolet radiations of the discharge tube.

4,047,070

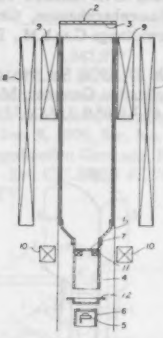
PYROELECTRIC VIDICON HAVING TARGET HEATING MEANS ON ACCELERATING ANODE

Thomas Conklin, North Seituate, R.I., assignor to North American Philips Corporation, New York, N.Y.

Filed Oct. 15, 1976, Ser. No. 732,734
Int. Cl.[2] H01J *29/45, 29/08*
U.S. Cl. 313—388 2 Claims

1. In a pyroelectric vidicon having a thermally responsive target, an electron gun for generating an electron beam, and means to scan the target with said electron beam, the improve-

ment wherein said electron gun comprises an electron emissive cathode, an accelerating anode including a diaphragm, and



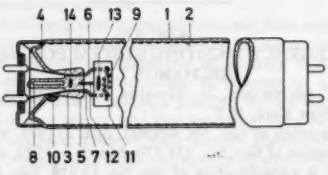
heating means on the side of said diaphragm facing said cathode for maintaining the target at a desired temperature.

4,047,071

LAMP HAVING AMALGAM CONTAINED IN A POROUS SILICATE MASS

Lothar Busch, Munich, and Günter Franck, Ebenhausen, both of Germany, assignors to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH, Munich, Germany

Filed Mar. 8, 1976, Ser. No. 665,054
Claims priority, application Germany, Mar. 10, 1975, 2510379
Int. Cl.² H01J *61/28, 61/42*
U.S. Cl. 313—490 **9 Claims**



1. A low pressure mercury vapor discharge lamp of the fluorescent type comprising a light-transmitting envelope sealingly enclosing spaced discharge means and an amalgam contained in a porous silicate mass which is secured on an interior surface of said lamp which determines the equilibrium pressure during operation of the lamp,

said amalgam comprising mercury and an amalgam-forming metal,

said amalgam-containing porous silicate having been prepared by admixing the amalgam-forming metal in a water glass solution having a density between 1.35 and 1.39, with a weight ratio on a dry basis of amalgam-forming metal to water glass of from 15:1 to 0.5:1.

4,047,072

MULTI-DIGIT FLUORESCENT DISPLAY TUBE

Takao Kishino; Kiyoshi Morimoto, and Yukihiko Utamura, all of Mobara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Japan

Filed Mar. 29, 1975, Ser. No. 671,150
Claims priority, application Japan, Mar. 28, 1975, 50-36848; May 16, 1975, 50-57457
Int. Cl.² H01J *61/067, 61/66*
U.S. Cl. 313—496 **7 Claims**

1. A multi-column fluorescent display tube comprising:

an insulating base plate,

a light transparent insulating cover plate joined to the base plate at a seal portion in air-tight fashion in order to maintain a vacuum condition therebetween,

a first wiring film disposed on the base plate,

a filament support supported by the base plate,

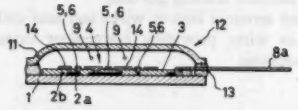
a second wiring film disposed on the base plate,

an insulating film disposed on the base plate to insulate the first and second wiring films and portions thereof,

a plurality of segment anodes forming a pattern display supported by the insulating film and connected to the first wiring film,

a plurality of fluorescent material layers disposed on the plurality of segment anodes,

a cathode disposed between the cover plate and the plurality of fluorescent material layers and connected to the filament support,



an electrification preventive layer connected to the second wiring film and supported by the insulating film and disposed adjacent to the plurality of segment anodes to prevent electrification due to the collision of electrons emitted from the cathode,

a plurality of first lead-in wires passing through the seal portion and connected to the first wiring film,

a second lead-in wire passing through the seal portion and connected to the cathode,

a third lead-wire passing through the seal portion and connected to the second wiring film,

means for applying to the electrification preventive layer a bias voltage having a value between the anode voltage and the average of the cathode voltage and the anode voltage,

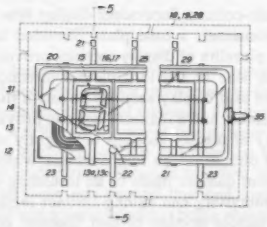
means for applying a DC voltge across the cathode and selected ones of the plurality of segment anodes.

4,047,073

MULTI-DIGIT FLUORESCENT INDICATING APPARATUS

Takao Kishino, Mobara, Japan, assignor to Futaba Denshi Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 509,716, Sept. 26, 1974, Pat. No. 3,986,760. This application Apr. 19, 1976, Ser. No. 678,444
Claims priority, application Japan, Jan. 25, 1974, 49-10110
Int. Cl.² H01J *61/067, 61/66*
U.S. Cl. 313—497 **2 Claims**



1. A multi-digit fluorescent indicating apparatus comprising:

a base plate;

a window plate hermetically sealed to said base plate forming an evacuated enclosure;

segmented electrode means forming each of multi-digit fluorescent indicating patterns disposed on said base plate within said enclosure;

a plurality of grid terminal lead-in wires with each grid terminal lead-in wire extending integrally substantially inside and substantially outside of the enclosure;

a spacer element disposed within the enclosure and integrally connected to each of said grid terminal lead-in wires;

a grid disposed within the enclosure and secured to each of said spacer elements;

a plurality of cathode terminal lead-in wires with each cathode terminal lead-in wire extending integrally substantially inside and substantially outside of the enclosure;

a cathode holding portion disposed within the enclosure and integrally connected to each of said cathode terminal lead-in wires;

a cathode disposed within the enclosure and connected to said cathode holding portion;

said grid terminal lead-in wires and said cathode terminal lead-in wires providing convenient external electrical connections.

4,047,074

MULTI-DIGIT FLUORESCENT DISPLAY TUBE WITH CATHODE FILAMENT SUPPORT

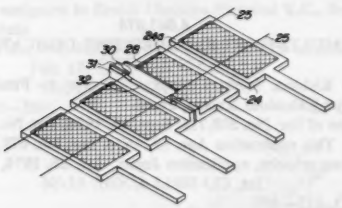
Takao Kishino; Nobuo Yamaguchi, and Yukihiko Utamura, all of Mobara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Japan

Filed Nov. 19, 1976, Ser. No. 743,357

Claims priority, application Japan, Nov. 22, 1975, 50-157959[U]

Int. Cl.² H01J *1/18, 1/72, 1/94, 63/06*

U.S. Cl. 313—497 **1 Claim**



1. In a multi-column fluorescent display tube having at least a vacuum container, a base plate provided in said vacuum container, a plurality of display sections provided on said base plate side by side in the longitudinal direction of said base plate, each of said display sections having a fluorescent material layer thereon, and a filament cathode provided opposite to said plurality of display sections and tightly stretched in the longitudinal direction; the improvement which comprises at least a filament damper made of an insulating material low in thermal conductivity and having contact sections for slightly urging the middle portion of said filament cathode substantially vertically to said filament cathode maintaining substantially parallel relations with the surface of said display sections so that said filament cathode may be tightly stretched, filament damper supporters made of conductive material and bonded to the peripheral wall surfaces of said filament damper except at least said contact sections, and said supporters being connected to conductive sections such as grid electrodes thereby preventing electrification of the surface of said filament damper.

4,047,075

ENCAPSULATED LIGHT-EMITTING DIODE STRUCTURE AND ARRAY THEREOF

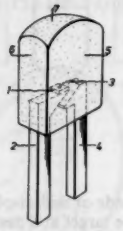
Werner Schoberl, Massenbachhausen, Germany, assignor to Licentia-Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 27, 1976, Ser. No. 662,086

Claims priority, application Germany, Mar. 1, 1975, 2509047

Int. Cl.² H05B *33/12, 33/16*

U.S. Cl. 313—500 **13 Claims**



1. In a light-emitting diode structure including a housing formed of a plastic material and having a light-emitting surface, and a semiconductor light-emitting diode embedded in said housing opposite and spaced from said light-emitting surface, the improvement wherein: said plastic housing has a rectangular cross section formed by first and second pairs of opposed parallel flat outer side surfaces; and said light-emitting surface is an outwardly curved end surface of said housing which extends to each of said side surfaces and is curved so that its surface area presents an area of uniform brightness to an observer.

4,047,076

EMERGENCY LIGHTING SYSTEM FOR GASEOUS DISCHARGE LAMPS

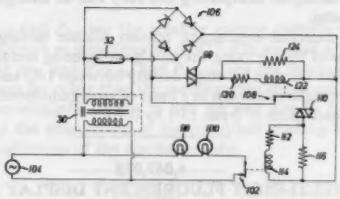
Albert C. McNamara, Jr., Houston, Tex., assignor to Esquire, Inc., New York, N.Y.

Continuation of Ser. No. 429,991, Jan. 2, 1974, which is a continuation of Ser. No. 231,870, March 6, 1972, abandoned, which is a continuation of Ser. No. 13,519, Feb. 24, 1970, abandoned, which is a division of Ser. No. 728,970, May 14, 1968, Pat. No. 3,517,254. This application Nov. 3, 1975, Ser. No. 628,055

The portion of the term of this patent subsequent to June 23, 1987, has been disclaimed.

Int. Cl.² H05B *37/00*

U.S. Cl. 315—88 **13 Claims**



1. An emergency lighting system comprising:

a gaseous-discharge lamp,

means for applying electrical energy to said gaseous-discharge lamp to operate said gaseous-discharge lamp, incandescent light means, and

switching means, including at least one solid-state voltage-breakdown device, for connecting said incandescent light means to said energy-applying means when said gaseous discharge lamp is extinguished to light said incandescent light means, and for disconnecting said incandescent light

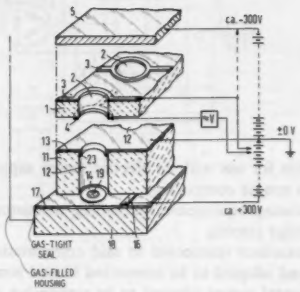
means from said energy-applying means after re-striking of said gaseous-discharge lamp, in response to the voltage across the gaseous-discharge lamp approaching a stable voltage.

4,047,077

DISCHARGE DISPLAY DEVICE (PLASMA-PANEL)

Werner Veith, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 9, 1976, Ser. No. 647,991
Claims priority, application Germany, Feb. 26, 1975, 2508393
Int. Cl.² H05B *41/16*
U.S. Cl. 315—169 TV **20 Claims**



1. A discharge display device in the form of a plasma panel, comprising:

a gas-filled, gas-tight housing;

a primary discharge arrangement in said housing, said primary discharge arrangement including

a common first cathode,

a first insulating matrix spaced from said first cathode and comprising a first insulating plate having a plurality of holes therethrough arranged in an array of rows and columns and corresponding in number to a desired number of image points, a plurality of first anodes carried on one side of said first insulating plate facing said first cathode, each of said anodes associated with a respective row of holes and extending about the edge of the holes, and a plurality of control electrodes carried on the other side of said first insulating plate, each of said control electrodes associated with a respective column of holes and extending about the edge of the holes, the cathode, first anodes and control electrodes adapted to be connected to potentials to cause electrons to emerge from the holes in a controlled fashion from the gas discharge; and

a plurality of main d.c. discharge paths, each of said discharge paths being defined by a second cathode and a second anode and being divided by and including a second insulating matrix aligned with said first insulating matrix, each of said second cathodes and said second anodes adapted to be connected to a potential to cause each of said d.c. discharge paths to be ignited by electrons received from the holes of said first insulating matrix.

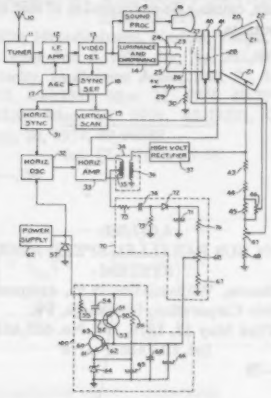
4,047,078

PULSE DIFFERENTIATING HIGH VOLTAGE SHUTDOWN CIRCUIT

David H. Meehan, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed June 1, 1976, Ser. No. 691,744
Int. Cl.² H01J *29/70*
U.S. Cl. 315—411 **5 Claims**

1. In a television receiver having a cathode ray tube display device in which one or more electron beams are directed to a viewing screen, horizontal scansion means producing a scansion signal having a long duration trace portion and a short duration retrace portion causing said beams to scan said viewing screen from side-to-side, vertical scansion means causing a top-to-bottom progression of successive side-to-side scans and high voltage generating means producing an electron accelerating potential for said cathode ray tube from said short duration retrace portion of said horizontal scansion signal, the improvement comprising:



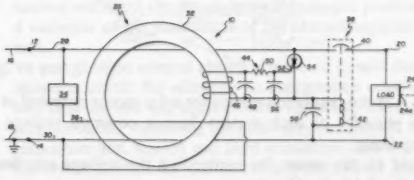
high voltage disabling means for rendering said high voltage generating means inoperative when said accelerating potential exceeds a pedetermined threshold including detection means simultaneously responsive to variations in the amplitude and duration of said retrace portion of said horizontal scansion means.

4,047,079

GROUND LEAKAGE CURRENT PROTECTION SYSTEM

Colin A. A. MacPhee, West Hill, Canada, assignor to Federal Pacific Electric Co., Newark, N.J.

Continuation of Ser. No. 771,451, Oct. 29, 1968, abandoned.
This application Dec. 16, 1974, Ser. No. 532,819
Int. Cl.² H02H *3/28*
U.S. Cl. 361—45 **20 Claims**



1. A ground leakage current protection system including first and second line terminals for connection to an AC power source and first and second load terminals for connection to a protected load, a differential current transformer including a core and having first and second windings on the core arranged to carry load current between said first line and load terminals and between said second line and load terminals, respectively, said and second windings being phased in relation to each other so that the load current carried by said windings tends to develop mutually cancelling flux in said core, said second line terminal being grounded at the side of said differential transformer remote from said load terminals, means for providing sustained AC biasing flux in said core out-of-phase with load current flux in the core produced by said first winding, switching means including a pair of normally open contacts interposed between said line and load terminals, a

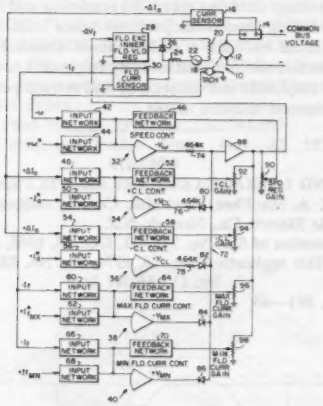
holding coil effective when energized for holding said contacts closed, said differential current transformer having an output winding providing an output signal in response to said AC biasing flux, and phasesensitive means responsive to the biasing flux output signal of said output winding in the absence of ground leakage current for maintaining said holding coil energized, said first and second winding producing an unbalanced flux in said core when ground leakage current occurs, said unbalanced flux opposing the biasing flux and, when of sufficient magnitude, causing de-energization of said coil and opening of said contacts.

4,047,080

COMMON BUS PARALLEL SPEED REGULATOR SYSTEM

Robert S. Peterson, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 12, 1976, Ser. No. 685,463
Int. Cl.² H02P 5/16
U.S. Cl. 318—79 **5 Claims**



1. A speed regulation system for a d.c. motor operated as one of a plurality of such motors from a common voltage bus comprising:

field exciter means for controlling the voltage supplied to the field of said motor;

a speed regulation controller, having a linearized transfer function, connected to receive a motor speed signal ω and a motor speed reference signal ω^*, and to deliver a speed control signal $-V_\omega$;

an armature current limit controller, having a linearized transfer function, connected to receive an armature current signal $+\Delta I_a$ and armature current reference signals $\pm I_a^*$ and to deliver an armature current control signal $\pm V_{CL}$;

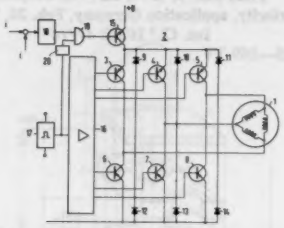
switching means for determining priority among said controllers, said controllers being connected in parallel to said switching means, said switching means delivering an output signal $-\Delta V_f$ to said field exciter means which is a function of the output of one selected controller, based on the order of priority: (1) field current controller, (2) armature current limit controller, (3) speed controller.

4,047,081

COMMUTATING ARRANGEMENT FOR AN ELECTRIC MOTOR SUPPLIED FROM A DC VOLTAGE SOURCE

Manfred Liska, Nurnberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 24, 1976, Ser. No. 660,848
Claims priority, application Germany, Feb. 27, 1975, 2508546
Int. Cl.² H02K 29/00
U.S. Cl. 318—138 **5 Claims**



1. A circuit for use with an electric motor supplied from a DC voltage source comprising:

a commutating arrangement including transistors arranged in a bridge circuit;

a main transistor connected to said commutating arrangement and adapted to be connected to said source;

a first control means adapted to be responsive to the rotor position of said motor providing on-off commands for controlling said transistors of said commutating arrangement;

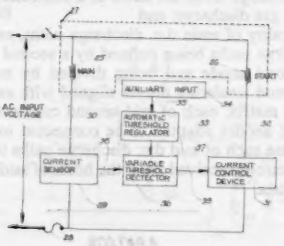
a second control means for providing on-off commands to said main transistor, said second control means feeding an off command of short duration to said main transistor when said control circuit delivers an on command to one of said transistors of said commutating arrangement.

4,047,082

VARIABLE THRESHOLD STARTING CIRCUIT FOR INDUCTION MOTOR

Paul R. Scheuer, West Lafayette; Karmen D. Cox, Lafayette, both of Ind., and Steven B. Sample, Lincoln, Nebr., assignors to Design & Manufacturing Corporation, West Lafayette, Ind.

Filed Sept. 4, 1975, Ser. No. 610,124
Int. Cl.² H02P 1/44
U.S. Cl. 318—221 E **11 Claims**



1. In combination with an induction motor starting circuit of the type having a sensing means for producing a first signal proportional to the main winding current, a current control means for allowing current flow through a start winding only when energized, and means for energizing said current control means when said first signal exceeds a threshold level, the improvement comprising:

a. means for producing a second signal proportional to at

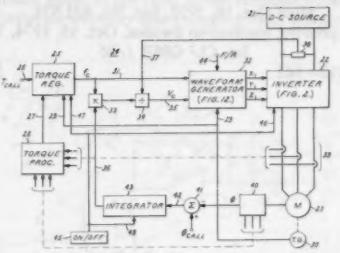
least one condition affecting said main winding current; and

b. means for adjusting said threshold level in accordance with the value of said second signal.

4,047,083
ADJUSTABLE SPEED A-C MOTOR DRIVE WITH SMOOTH TRANSITION BETWEEN OPERATIONAL MODES AND WITH REDUCED HARMONIC DISTORTION

Allan Barr Plunkett, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Mar. 8, 1976, Ser. No. 664,951
Int. Cl.² H02M *1/08*
U.S. Cl. 318—231 **23 Claims**



1. Improved static electric power apparatus having relatively positive and negative d-c input terminals adapted to be connected to a source of voltage, a plurality of a-c output terminals adapted to be connected to a variable frequency alternating current load, and means for connecting each of said output terminals to both of said input terminals in a manner to convert unipolarity voltage applied to said input terminals into alternating voltage at said output terminals, said connecting means comprising at least one pair of alternately conducting controllable electric valves interconnecting one of said output terminals and the respective input terminals of said apparatus, firing and commutating means for periodically switching the conducting states of said valves, and means responsive to frequency and amplitude command signals for controlling the operation of said firing and commutating means so as to vary, as functions of said command signals, the frequency and the amplitude of the fundamental component of said alternating voltage, wherein the control means includes:

a. first means responsive to said frequency command signal for generating a periodic reference signal having a frequency which depends on said frequency command signal;

b. second means keyed by said reference signal for causing said firing and commutating means to switch the conducting states of said valves at certain moments during each cycle of the fundamental component of said alternating voltage, the timing of a predetermined first switching moment in each half cycle of said fundamental component of voltage being established by said reference signal and any subsequent switching moments in the same half cycle occurring in accordance with a schedule comprising at least:

i. a moment following said first switching moment by a variable angle alpha (α) measured in electrical degrees of a full cycle of fundamental voltage,

ii. a moment following said first switching moment by another variable angle beta (β) measured in electrical degrees of a full cycle of fundamental voltage, β being larger than α but less than 90°,

iii. A moment occurring 180° -β after said first switching moment, and

iv. a moment occurring 180° -α after said first switching moment;

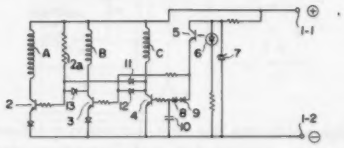
c. third means for varying α as a function of β so as to minimize selected harmonics of said alternating voltage; and

d. fourth means for varying β as a function of said amplitude command signal to thereby vary the amplitude of the fundamental voltage component.

4,047,084
SEMICONDUCTOR MOTOR CONTROLLED FOR ENERGIZATION BY A SINGLE POSITION SENSING ELEMENT

Itsuki Ban, 829, Higashiotzumi, Nerima, Tokyo, Japan

Filed Feb. 6, 1975, Ser. No. 547,507
Claims priority, application Japan, Feb. 21, 1974, 49-19959; Feb. 27, 1974, 49-22361; Mar. 15, 1974, 49-29229; Mar. 15, 1974, 49-29230; Mar. 15, 1974, 49-29231; July 8, 1974, 49-77439; Aug. 20, 1974, 49-94589
Int. Cl.² H02K *29/00*
U.S. Cl. 318—254 **13 Claims**



1. A semiconductor motor comprising:

a. first, second and third phase armature coils mounted on a stator;

b. a field arranged to face to said armature coils including a plurality of magnetic poles in which the other in an equal pitch;

c. a disc member providing at a circumferential portion thereof with first, second and third three-step electromagnetic anisotropic portions;

d. an electromagnetic coil arranged to face said disc member of sensing said electromagnetic anisotropic portions upon a rotation of the motor to cause the inductance of the coil to be varied;

e. an oscillator source connected to said electromagnetic coil for feeding an alternating current to said electromagnetic coil;

f. a dicrimminating circuit connected to said coil for obtaining first, second and third electric signals from said first, second and third electromagnetic anisotropic portions via a variation of the inductance of the electromagnetic coil; and,

g. an energization control circuit connected to said discrimmination circuit for effecting an energization control via said first, second and third electric signals by conducting semiconductor switching elements seriesconnected to the respective first, second and third aramature coils whereby a rotation control for the motor is achieved by position sensing signals due to an induction.

4,047,085
METHOD AND APPARATUS FOR CONTROLLING A WEB HANDLING DEVICE

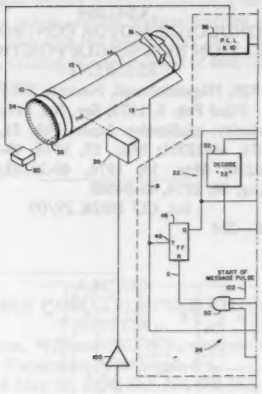
Gary B. Ollendick, Chicago, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Mar. 1, 1976, Ser. No. 662,781
Int. Cl.² G05B *19/28*
U.S. Cl. 318—601 **19 Claims**

1. A control circuit for sensing the condition of a web wrapped about a rotating drum displaying an outer surface wherein the web carries a positional indicator comprising:

means fixed with respect to the axis of rotation of the drum for sensing the presence of said web indicator for each passage across a predetermined location and for generating an indicator signal in response thereto,

means responsive to a selected one of said indicator signals for initiating the generation of a first series of positional signals, each signal corresponding to a subsequent predetermined rotational position of the indicator carried by the web; and



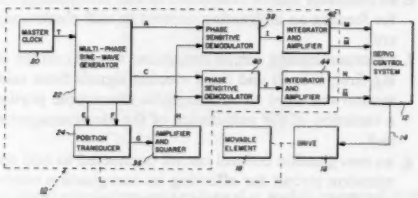
first means for comparing the concurrance of at least one of said indicator signals with at least one of said positional signals so as to ascertain whether said web indicator has rotated a predetermined amount since said selected indicator signal.

4,047,086

PHASE-SENSITIVE TRANSDUCER APPARATUS

Kenneth W. Cocksedge, Pleasanton, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 25, 1976, Ser. No. 670,465
Int. Cl.² G05B 1/01
U.S. Cl. 318—608 **17 Claims**



1. In a phase-sensitive transducer apparatus comprising first and second relatively movable members, said first relatively movable member having a plurality of windings and said second relatively movable member having a winding; and means for applying a first input signal to one of the windings of said first relatively movable member and a second input signal to another of the windings of said first relatively movable member, an output signal being developed on the winding of said second relatively movable member, said first and second input signals being sinusoidal in nature of substantially identical frequency and peak amplitude and being phase-displaced by a predetermined amount, and said output signal being substantially constant in peak amplitude and variable in phase during relative movement of said first and second relatively movable members, the improvement comprised in that said means for applying comprises:

clock means for generating a clock signal at a clock frequency;

means coupled to said clock means and responsive to said clock signal for generating a plurality of mutually phase-displaced square-wave signals of substantially identical frequency and peak amplitude;

means coupled to said means for generating and responsive to a first group of said plurality of square-wave signals for deriving said first input signal and responsive to a second group of said plurality of square-wave signals different than said first group for deriving said second input signal; and

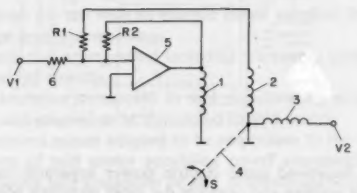
means for respectively coupling said first and second input signals to said one and said other windings of said first relatively movable member.

4,047,087

ELECTROMECHANICAL TRANSDUCER

Carl Torbern Telling, Lidingo, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Oct. 10, 1975, Ser. No. 621,571
Claims priority, application Sweden, Oct. 15, 1974, 7412929
Int. Cl.² G05B 1/06
U.S. Cl. 318—661 **5 Claims**



1. An electromechanical transducer for converting mechanical analog angular information to electrical linear information, comprising

a primary winding and at least one first and one second secondary winding, said first and said second secondary windings being spatially arranged perpendicularly to each other and rotatable together in relation to the primary winding;

an amplifier, said primary winding being connected to the output of said amplifier;

said amplifier being fed back by two feedback circuits, a first of said circuits including a first impedance over which is fed a voltage proportional to the output voltage of said amplifier and the second of said circuits being a series connection of said first secondary winding and a second impedance;

means applying an input voltage to said amplifier;

the values of said first and second impedances and the turns ratios of said windings being chosen so that the relation between the voltage across said second secondary winding and the input voltage to said amplifier is a linear measure of the rotation of the secondary windings in relation to the primary winding.

4,047,088

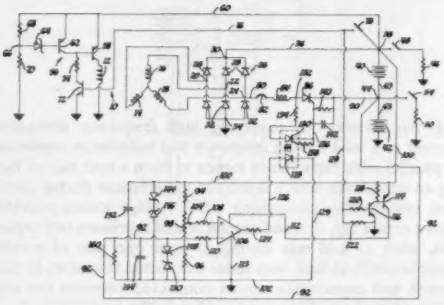
DUAL VOLTAGE CHARGING SYSTEM

Dennis W. Himmler, Clawson, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 9, 1976, Ser. No. 694,158
Int. Cl.² H02J 7/14
U.S. Cl. 320—6 **3 Claims**

1. A motor vehicle electrical system comprising, an alternating current generator having a polyphase output winding and a field winding, a polyphase full-wave bridge rectifier having AC input terminals and direct voltage output terminals, means connecting said output winding with said AC input terminals of said bridge rectifier, positive and negative power supply conductors connected respectively with said direct voltage output terminals, first and second batteries, means connecting

said batteries in series across said power supply conductors whereby said batteries can be charged at times in series by the direct voltage output of said bridge rectifier, the negative terminal of one battery connected to the positive terminal of the other battery, the connection between said batteries defining a battery junction having a voltage intermediate the voltage of said power supply conductors, voltage regulating means including voltage sensing means connected across said power supply conductors and a field current control means for controlling field current as a function of the voltage sensed by said sensing means to thereby maintain the voltage across said power supply conductors substantially constant, voltage divider means connected across said power supply conductors having a voltage divider junction that has a voltage intermediate the voltage of said power supply conductors, the ratio of voltage division provided by said voltage divider means being substantially equal to the ratio of the terminal voltage ratings of said batteries whereby said voltage divider junction and said



battery junction have substantially equal voltages during certain conditions of operation of said system, a circuit connected between one phase winding of said output winding and said battery junction for at times supplying charging current to said second battery, said circuit comprising in a series connection an inductive circuit element and the anode-cathode circuit of a first controlled rectifier, a second controlled rectifier having an anode connected to said one phase winding and a cathode connected to the gate of said first controlled rectifier, said second controlled rectifier operative to gate said first controlled rectifier conductive when said second controlled rectifier is gated conductive, and means coupled to said battery and voltage divider junctions and to said second controlled rectifier for gating said second controlled rectifier conductive when the voltage at said voltage divider terminal exceeds the voltage at said battery terminal by a predetermined amount, said first controlled rectifier being nonconductive when the voltage at said battery terminal is substantially equal to or greater than the voltage of said voltage divider junction.

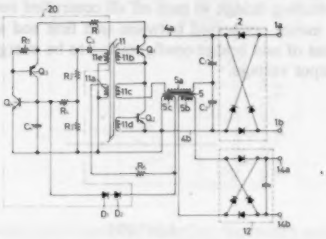
4,047,089

STARTING CIRCUIT FOR INVERTER

Tadao Suzuki; Tadao Yoshida, and Shigeaki Wachi, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed June 10, 1976, Ser. No. 694,713
Claims priority, application Japan, June 14, 1975, 50-72393
Int. Cl.² H02M 3/335
U.S. Cl. 363—49 **9 Claims**

1. A starting circuit for an inverter comprising:
a. A DC voltage source having first, second and voltage reference terminals;
b. an input transformer having a primary winding, a pair of secondary windings and a saturable magnetic core;
c. an output transformer having a primary winding, a secondary winding and a feedback winding;
d. first and second transistors each having base, emitter and collector electrodes, the collector-emitter circuits of which are connected, through the primary winding of said output transformer, between the first and voltage reference terminals of said DC voltage source, and between the second and voltage reference terminals thereof, respectively, and the base-emitter circuits of which are connected across the corresponding secondary windings of said input transformer, respectively;
e. circuit means for connecting the primary winding of said input transformer to the feedback winding of said output transformer;
f. first control means including at least a control winding



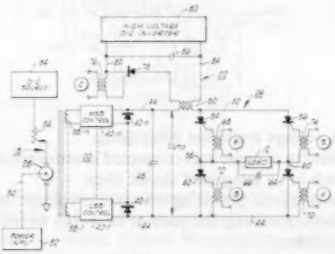
provided in connection with said saturable magnetic core of said input transformer, and capacitor means connected to said control winding for supplying an exciting current which flows through said control winding then the capacitor means is discharged so as to put one of said first and second transistors in its conductive state when said DC voltage source is operated; and
g. second control means for detecting the secondary voltage of said output transformer and stopping the operation of said first control means when the secondary voltage reaches a predetermined value.

4,047,090

DIGITAL CONTROLLED LOW FREQUENCY POWER AMPLIFIER

William L. Chapman, and Larry L. Newlin, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Feb. 25, 1976, Ser. No. 661,066
Int. Cl.² H02M 5/45
U.S. Cl. 363—34 **6 Claims**



1. A power amplifier comprising:
means for generating a plurality of A-C voltages which are binarily related in amplitude;
means for rectifying selected ones of said binarily related A-C voltages to produce respective binarily related rectified and filtered voltages;
means for summing the respective ones of said plurality of binarily related rectified and filtered voltages to provide an output voltage;
a polarity switching bridge receiving said output voltage, said bridge consisting of first and second controlled recti-

fiers having common anode connection to said output voltage and having cathodes connected via first and second junctions to anodes of third and fourth controlled rectifiers which have common cathode connection to the output voltage common;

logic circuit means alternately providing first and second gate outputs for energizing alternately said first and fourth controlled rectifiers;

commutation circuit means energizable upon alternation of first and second gate outputs from said logic circuit means to generate reverse bypass voltage across said polarity switching bridge to turn off all controlled rectifiers; and

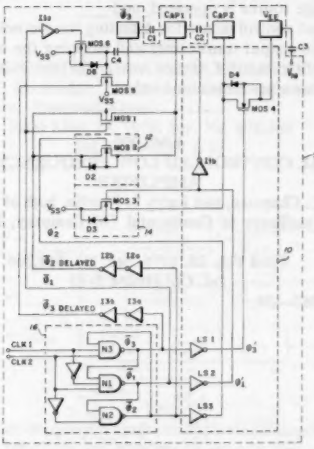
load means connected between said first and second junctions of said bridge configuration to be energized by said output voltage.

4,047,091

CAPACITIVE VOLTAGE MULTIPLIER

Jimmy L. Hutchines, San Jose, and John E. Meyer, Saratoga, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed July 21, 1976, Ser. No. 707,395
Int. Cl.² H02M 7/00
U.S. Cl. 363—59 **3 Claims**



1. A voltage multiplier comprising:

a plurality of capacitors connected in series across the output pads of an integrated circuit chip;

a clock circuit providing multiphase voltage output;

means connecting the pads of said chip to MOS transistor switches;

means interconnecting said MOS switches to said clocking circuit such that during successive phases of operation said switches are closed in such a manner that the series connected capacitors are separately charged to the input voltage successively during each phase of said clock circuit; and

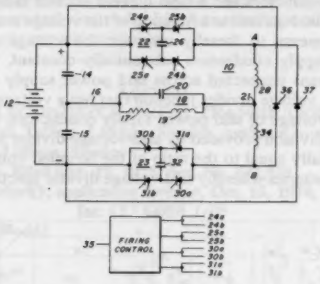
means operable during the final phase of operation of said clock for connecting an output capacitor to said input voltage and said series connected capacitors such that the voltage developed across the output capacitors is the sum of all the voltages across the series connected capacitors plus the input voltage.

4,047,092

HIGH FREQUENCY INVERTER

Gabor J. Bendzsak, Montreal, Canada, assignor to Ajax Magnethermic Corporation, Warren, Ohio

Filed July 26, 1976, Ser. No. 708,995
Int. Cl.² H02M 7/515
U.S. Cl. 363—135 **5 Claims**



1. An inverter for supplying high frequency alternating current to a load having resistance and inductance connected in parallel with capacitance means to form a tank circuit having an impedance which is subject to variations during operation, said inverter comprising a DC voltage source provided with a center tap, first and second sets of thyristors and capacitors, each of said sets having at least one pair of parallel branches with at least two series-connected thyristors in each branch and capacitance means connected between the midpoints of the branches of each said pair, the first said set being connected to the positive side of said voltage source, the second said set being connected to the negative side of said voltage source, one side of said load being connected to said center tap, a first inductance means connected in series between said first set and the other side of said load, a second inductance means connected in series between said second set and said other side of said load, said inductance means forming tuned circuits with said load and said capacitance means, a first diode means having its anode connected to the negative side of said voltage source and its cathode connected to the terminal of said first inductance means which is not connected to the load, a second diode means having its cathode connected to the positive side of said voltage source and its anode connected to the terminal of said second inductance means which is not connected to the load, and means for firing said thyristors in a predetermined sequence alternating between the first and second of said sets to cause an alternating current to flow in the load, the thyristors of each set being fired in pairs, each pair consisting of thyristors in different parallel branches of the set, the thyristors of each pair being in series relation with the capacitance means, and the pairs of each set being fired alternately, whereby the polarity of the voltage across the capacitance means within each said set reverses with each half-cycle of current delivered by said set.

4,047,093

DIRECT THERMAL-ELECTRIC CONVERSION FOR GEOTHERMAL ENERGY RECOVERY

Larry Levoy, 799 36th Ave., San Francisco, Calif. 94121

Filed Sept. 17, 1975, Ser. No. 614,319
Int. Cl.² H01J 45/00
U.S. Cl. 322—2 R **39 Claims**

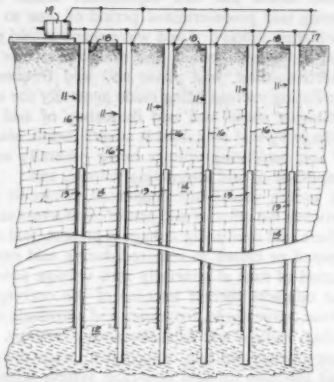
1. An in situ system for converting geothermal energy into electricity including a well drilled from ground surface into a high-temperature underground geological strata, comprising in combination,

a. a first high-temperature heat pipe structure longitudinally aligned parallel the axis of said well having a lower section

thermally coupled to said high-temperature geological strata and an upper end section extending toward the ground surface,

b. a second low-temperature heat pipe structure longitudinally aligned parallel the axis of said well having a lower end section coaxially receiving the upper end section of said high-temperature heat pipe structure defining an annular volume between the upper end section of the high-temperature heat pipe structure and the lower surrounding end section of the low-temperature heat pipe structure,

c. means for cooling said second low-temperature heat pipe structure,



d. conversion means positioned within said annulus defined between the upper end section of said high-temperature heat pipe structure and the lower surrounding end section of said low-temperature heat pipe structure for thermally coupling said first high-temperature heat pipe structure to said second low-temperature heat pipe structure and for generating an electric current responsive to a temperature difference between said first and second heat pipe structures, and

e. means connected to said conversion means for conducting said generated electrical current to the ground surface.

4,047,094

MHD GENERATOR WITH IMPROVED NETWORK COUPLING ELECTRODES TO A LOAD

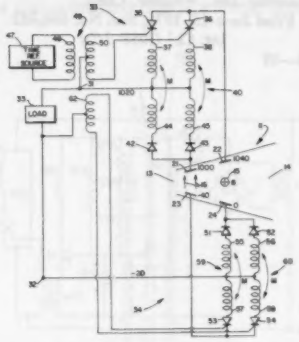
Richard J. Rosa, Bozeman, Mont., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 22, 1976, Ser. No. 707,925

Int. Cl.² H02N *4/02*

U.S. Cl. 322—7 **8 Claims**

1. In combination with an MHD generator having a plurality of segmented electrodes extending longitudinally of a duct whereby progressively increasing high DC voltages are derived from a set of cathode electrodes of the generator and progressively increasing low DC voltages are derived from a set of anode electrodes of the generator, a first common terminal for the high voltage cathode electrodes, a second common terminal for the low voltage anode electrodes, said common terminals adapted to be normally maintained at predetermined voltages and to be connected across a load for the generator, a network for coupling one of said sets of electrodes to one of said terminals comprising: a controlled switch connected between a first electrode of the one set and said one common terminal, a rectifier connected between a second electrode of the one set and said one common terminal, said first and second electrodes having voltages on opposite sides of the voltage of said one common terminal, said rectifier being connected so that it is normally cut off by the voltage between the second electrode and said one common terminal, said switch being connected so that it is normally conductive between the first electrode and said one common terminal once it has been triggered into a conducting state in response to a control sig-



nal, and means for inductively coupling the switch and rectifier together so that the rectifier is biased into a conducting state in response to a change in the current flow through the switch.

4,047,095

BRUSHLESS THREE-PHASE CURRENT GENERATOR HAVING A DEVICE FOR SELF-EXCITATION AND AUTOMATIC CONTROL OF THE ENERGIZING CURRENT

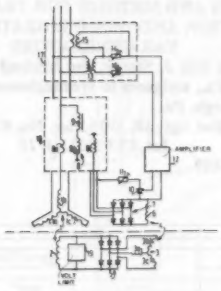
Wierd Wijnterp, Hengelo, Netherlands, assignor to Heemaf B.V., Hengelo, Netherlands

Filed Aug. 15, 1975, Ser. No. 605,180

Claims priority, application Netherlands, Aug. 22, 1974, 7411221

Int. Cl.² H02P *9/30*

U.S. Cl. 322—17 **7 Claims**



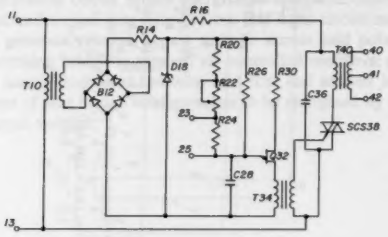
1. A brushless three-phase current generator having a rotating field winding and a fed-back, controllable device for self-excitation and automatic control of energizing current, said device comprising controllable means for deriving from the generator output part of the output voltage and the load current of the generator and for the vectorial combination and supply thereof to a multi-phase rectifier whose output is connected to a stationary d.c. energizing winding of an excitor, said excitor having a rotating multi-phase winding which enables the rotating field winding of the generator through a commonly rotating rectifier, characterized in that the synchronous reactance of each phase of the multi-phase winding of the excitor at the frequency corresponding to the nominal speed is greater than the equivalent resistance of the generator field winding.

4,047,096

APPARATUS FOR INSTANTLY COMPENSATING FOR LINE VOLTAGE IRREGULARITIES

George Robison Madewell, Hixson, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed June 15, 1976, Ser. No. 696,452
Int. Cl.[2] G05F 3/04
U.S. Cl. 323—19 3 Claims



1. In a current control circuit of the type that triggers means for permitting current from a supply voltage when the charge on a capacitor reaches a trigger level, the capacitor being charged by a charging current, at least part of which is caused by a charging-voltage source and a first series resistance in series with the charging-voltage source that are connected across the capacitor, the improvement comprising:

a. a second series resistance connected in series with the charging-voltage source, the first series resistance, and the capacitor; and

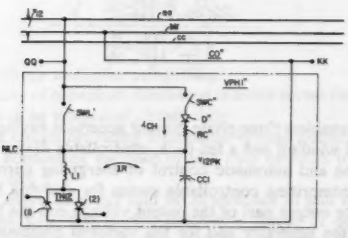
b. means, connected across the second series resistance, thereby forming a loop comprising itself and the second series resistance, and including a second voltage source whose value is essentially proportional to the instantaneous value of a rectified version of the supply voltage, for causing current to flow in the loop.

4,047,097

APPARATUS AND METHOD FOR TRANSIENT FREE ENERGIZATION AND DEENERGIZATION OF STATIC VAR GENERATORS

Laszlo Gyugyi; Eric J. Stacey, and Michael B. Brennen, all of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1976, Ser. No. 677,202
Int. Cl.[2] H02J 3/18
U.S. Cl. 323—119 13 Claims



1. Electrical apparatus, comprising:

a. a pair of electrical conductors in an electrical system, said pair of conductors having an alternating voltage of predetermined amplitude, frequency, wave shape and reference phase impressed thereacross, one of said conductors having a current flowing therethrough which is related to said alternating voltage;

b. voltage sensing means interconnected in circuit relationship with one of said conductors for determining said reference phase and said frequency during a predetermined period of time, said voltage sensing means having an output at which is provided an output signal related to said reference phase and said frequency;

c. capacitance means interconnected in circuit relationship at one terminal thereof with one of said conductors;

d. inductance means including gated controllable switch means interconnected in circuit relationship at one terminal thereof with said one of said conductors and interconnected in circuit relationship at another terminal thereof with another terminal of said capacitance means, the gate of said controllable switch means being connected to said output terminal of said voltage sensing means, said inductance means and said capacitance means cooperating during said predetermined period of time to provide an oscillating voltage of said wave shape at said point where said inductance means and said capacitance means are interconnected, said phase and said frequency of said oscillating voltage being made generally the same as said reference phase and said frequency of said alternating voltage by said controllable switch means, said amplitude of said oscillating voltage being generally equal to said amplitude of said alternating voltage; and

main switch means interconnected in circuit relationship between the other of said pair of conductors and said point where said oscillating voltage is present, said means being opened or closed as required during said predetermined period of time at generally zero voltage potential across the contacts thereof because of the correspondence of phase, wave shape, frequency and amplitude of said oscillating voltage and said alternating voltage, said inductance means and said capacitance means providing a circuit function for said electrical system when connected between said pair of conductors during a period of time other than said predetermined period of time.

4,047,098

PROCESS AND A DEVICE FOR PROSPECTING THE OCEAN BED BY MEASURING ELECTROMAGNETIC FIELDS

Jean Duroux, 12, rue Flatters, 75005 Paris, France

Filed July 24, 1975, Ser. No. 598,915
Claims priority, application France, July 30, 1974, 74.26465
Int. Cl.[2] G01V 3/08
U.S. Cl. 324—6 13 Claims

1. A process for prospecting the beds of rivers, lakes or the ocean by means of an electromagnetic emission and the measurement of at least one component of the field obtained at a specific distance above the area to be prospected, comprising the steps of

generating a controlled electromagnetic emission continuously and at a predetermined frequency less than 100 Hz from a location at the surface of the water, and

measuring the amplitude and phase of the selected component or components at the surface of the water at a location spaced a relatively great distance from the location of the electromagnetic emission, said component or components being either the transverse electric component Ey at the water surface or at least two components including the radial magnetic component Hx and either the vertical magnetic component Hz or the transverse electric component Ey, the steps of generating and measuring being carried out during a single dragging movement over the surface of the water while maintaining substantially the

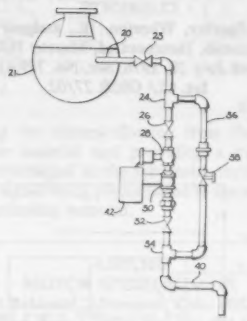
same distance between the generating and measuring locations.

4,047,099

METHOD AND APPARATUS FOR DETERMINING BOILER WATER CONDUCTIVITY

Lawrence A. Berger, Orange, and Robert Carroll Hunt, Santa Ana, both of Calif., assignors to Uniloc, Incorporated, Irvine, Calif.

Filed Sept. 15, 1975, Ser. No. 613,205
Int. Cl.² G01N 27/42
U.S. Cl. 324—30 R **10 Claims**



1. In a boiler system having a boiler water conductivity probe, an improved apparatus for providing a signal responsive to the conductivity of the boiler water with minimal regard to short term fluctuations due to the presence of steam bubbles or the like comprising:

generating means coupled to a conductivity probe for providing an alternating first signal responsive to the apparent conductivity of the fluid surrounding the probe, said apparent conductivity being represented by short term fluctuations in said first signal;

detecting means coupled to said conductivity probe and responsive to said first signal for providing second signals corresponding to the peak values of said first signal and not to the short term fluctation in said first signal;

storage means coupled to said detecting means for temporarily retaining said second signals; and,

decay means for permitting said second signals retained by said storage means to decay at a decay rate selected to be greater than the corresponding rate of change of conductivity of the boiler water during blowdown and selected for minimal decay of said retained signals within the short term fluctuations between peak signals.

4,047,100

METER FOR MEASURING SYRUP RATIO IN SOFT DRINKS AND THE LIKE

Myron L. Robinson, Solana Beach, Calif., assignor to Simekus, Inc., Vista, Calif.

Filed Apr. 13, 1976, Ser. No. 676,566
Int. Cl.² G01N 27/42
U.S. Cl. 324—30 B **12 Claims**

1. In an instrument for measuring the conductivity ratio of two liquids, the combination of:

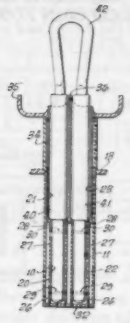
first and second elongate conductivity cells of substantially equal volume mounted in said instrument side-by-side with their axes substantially parallel,

each of said cells having an upper portion with an open end and a lower portion with a closed end and having spaced electrodes in the lower portion for providing an electrical path through a liquid in the cell,

with said upper portions of said cells formed of a single metal member and with said lower portions of each of said cells including upper and lower electrodes in the form of annular bands and an insulating tube between said bands, with said tube and bands having a flush inner surface;

means for introducing a liquid into each of said cells;

means for connecting said cells in a bridge circuit;



an ac power source connected as an input to said bridge circuit; and

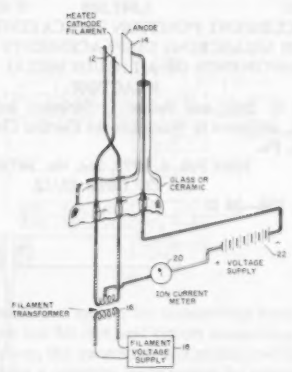
indicator means for indicating the output of said bridge circuit.

4,047,101

FILAMENT FOR ALKALI METAL IONIZATION DETECTOR

James E. Bauerle, Pittsburgh; William H. Reed, Monroeville, and Edgar Berkey, Murrysville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 8, 1976, Ser. No. 647,464
Int. Cl.² G01N 27/00
U.S. Cl. 324—33 **8 Claims**



1. An alkali metal ionization detector comprising:

a thermal ionizer means consisting of a first electrode having an oxide protective coating for responding to impinging alkali metal atoms and compounds present in a carrier gas by producing positive alkali metal ions by thermal surface ionization of the alkali metal atoms and compounds,

first circuit means for maintaining the temperature of said thermal ionizer means at a temperature to ionize said alkali metal atoms and compounds,

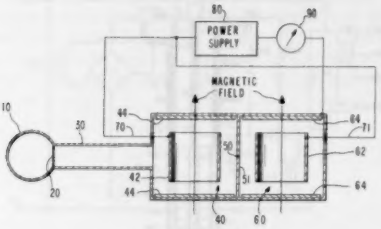
second electrode means, and

second circuit means for establishing a flow of said positive alkali metal ions from said thermal ionizer means to said second electrode, said flow of positive alkali metal ions being indicative of the concentration of said alkali metal present in said carrier gas.

4,047,102
DUAL CHAMBER, HIGH SENSITIVITY GAS SENSOR AND PUMP

Kimo M. Welch, Mountain View, Calif., assignor to Varian Associates, Palo Alto, Calif.

Continuation of Ser. No. 519,369, Oct. 30, 1974, abandoned.
This application May 3, 1976, Ser. No. 682,554
Int. Cl.[2] G01N *27/00*
U.S. Cl. 324—33 19 Claims

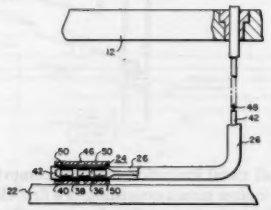


1. Gas sensing apparatus comprising:
a gas sensing unit; inlet means to said gas sensing unit comprising an inlet wall preferentially transmissive to gas under investigation;
a gas pumping unit having means for pumping gas, and passage means forming a conductance interconnecting said sensing and pumping units;
said sensing unit being constructed to have little or no pumping speed relative to the pumping speed of said pumping unit; and
the value of said conductance being small relative to the pumping speed of said pumping unit, whereby in operation the pressure in said sensing unit is higher than the pressure in said pumping unit to provide high sensitivity.

4,047,103
EDDY CURRENT POSITION INDICATING APPARATUS FOR MEASURING DISPLACEMENTS OF CORE COMPONENTS OF A LIQUID METAL NUCLEAR REACTOR

Clifford K. Day, and James L. Stringer, both of Richland, Wash., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 4, 1975, Ser. No. 547,074
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—34 D 11 Claims

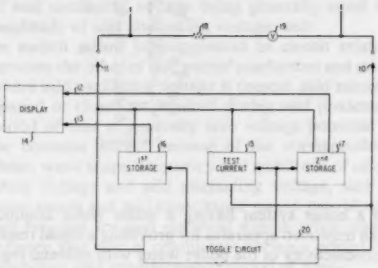


1. Apparatus for measuring displacements of a component of a liquid metal nuclear reactor immersed within the liquid metal coolant comprising:
an eddy current probe having a primary and secondary winding,
a dry thimble, adapted to be supported by a stationary portion of the reactor within the liquid metal coolant, housing the eddy current probe, which is stationarily supported therein during operation of the probe, and isolating the probe from the coolant, and
an electrically conductive annular ring with resistivity significantly different than the liquid metal coolant rigidly affixed to the component being monitored and slidably positioned around the periphery of the thimble concentric with the probe and symmetrically situated along the primary and secondary windings of the probe so that motion of the ring along the probe produces a proportional change in current in the secondary winding electrical output and wherein the annular ring includes a resistivity discontinuity formed from a cavity within the ring filled with a substance having a resistivity significantly different from the annular ring and the liquid metal coolant.

4,047,104
OHMMETER FOR CIRCUITS CARRYING UNKNOWN CURRENTS

Richard Grant Sparber, Wheaton, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 28, 1976, Ser. No. 709,429
Int. Cl.[2] G01R *27/02*
U.S. Cl. 324—62 10 Claims



1. An ohmmeter circuit for measuring the resistance of a powered circuit comprising a pair of probes extending from said circuit for engagement with portions of said powered circuit; a first and second voltage storing means connectable to said probes; switching circuitry for controlling in alternating fashion the connection of said first and second voltage storing means to said probes; a current source associated with said first voltage storing means and being connected concurrently therewith to said probes by said switching circuitry; and a directly readable display connected to said first and second voltage storing means for indicating as a function of the difference of voltages stored thereon the resistance of said powered circuit between points therein touched by said probes.

4,047,105
METHOD AND APPARATUS FOR PROVIDING AN OUTPUT INDICATION PROPORTIONAL TO THE MOISTURE CONTENT OF PARTICULATE MATERIAL

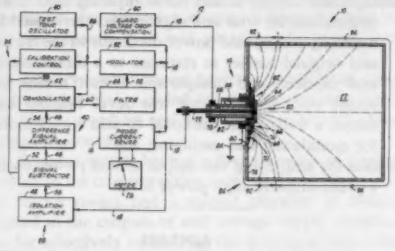
Bruce Olen Anderson, Oklahoma City, Okla., assignor to The Dolese Company, Oklahoma City, Okla.

Filed Feb. 24, 1976, Ser. No. 660,917
Int. Cl.[2] G01R *27/02*
U.S. Cl. 324—65 R 12 Claims

1. An apparatus for providing an output indication proportional to the moisture content of particulate material, the apparatus comprising:
a signal generator providing a probe drive signal having a predetermined frequency and a predetermined amplitude;
a probe connected to the signal generator and having a portion contacting the particulate material, the probe receiving the probe drive signal and applying the probe drive signal to the particulate material;
feedback control means connected to the probe and to the signal generator, the feedback control means sensing deviations of the amplitude of the probe drive signal applied to the particulate material via the probe from the predetermined amplitude and modulating the amplitude of the

probe drive signal provided via the signal generator to maintain the amplitude of the probe drive signal at the predetermined amplitude; and

a probe current sensor interposed generally between the signal generator and the probe, the probe current sensor



measuring the current flowing from the probe to the particulate material and providing a current indicator signal proportional to the measured current, the current indicator signal being proportional to the moisture content of the particulate material.

4,047,106

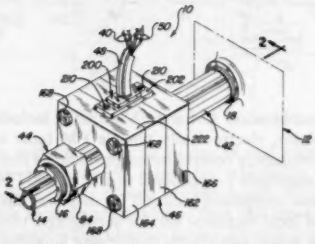
MOTOR SPEED SENSOR

Charles Elbert Robinson, Livermore, Colo. 80536

Filed June 1, 1976, Ser. No. 691,450

Int. Cl.² G01P *3/36*

U.S. Cl. 324—175 **10 Claims**



1. A motor speed sensor for placement between a take-off from said motor and a flexible drive for a tachometer, said take-off providing rotation proportional to the speed of said motor, said sensor comprising:

means connected to said take-off for extending the rotation of said take-off to said flexible drive,

a light source for providing a beam of light,

means operative with the rotation of said extending means for interrupting the beam of light at a rate that is proportional to said speed of said motor, and

means receptive of said interrupted beam for generating a series of pulses, the frequency of said pulses being proportional to said speed.

4,047,107

PULSE WIDTH RESPONSIVE SECURITY SYSTEM

Harvey Frank Dickinson, Bramhall, England, assignor to Ferranti Limited, Hollinwood, England

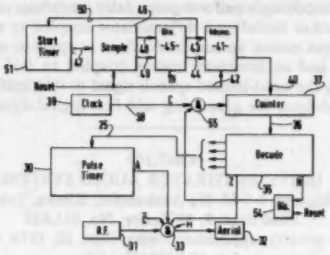
Filed May 14, 1975, Ser. No. 577,164

Claims priority, application United Kingdom, May 18, 1974, 22281/74

Int. Cl.² H04B *1/00*

U.S. Cl. 325—37 **13 Claims**

1. A security system transmitter comprising a high frequency wave generator for generating high frequency waves, first gating means operable to pass said high frequency waves, means for generating a group of pulses of predetermined frequency to operate the gating means by their sequential application including a charging circuit having a plurality of resistors, means for connecting each resistor in turn to determine the



time constant of the charging circuit and the duration of each pulse generated whereby said group has a unique identity specified by the particular duration of the constituent pulses, and a tuned circuit aerial for transmitting pulses of high frequency waves passed by the gating means.

4,047,108

DIGITAL TRANSMISSION SYSTEM FOR TRANSMITTING SPEECH SIGNALS AT A LOW BIT RATE, AND TRANSMISSION FOR USE IN SUCH A SYSTEM

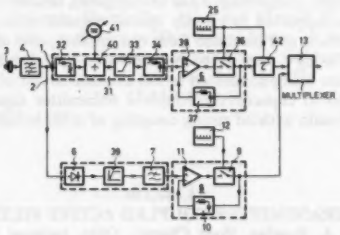
Arnold Jan Bijker, and Karel Riemens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 10, 1975, Ser. No. 594,591

Claims priority, application Netherlands, Aug. 12, 1974, 7410763

Int. Cl.² H04N *7/12*; H04B *7/00*

U.S. Cl. 325—38 B **10 Claims**



1. Digital transmission system for transmitting band limited speech signals at a low bit rate, said system comprising a transmitter and a receiver, the transmitter comprising two transmitter channels having a common input means for receiving the speech signal to be transmitted, one of said channels including a first transmission device means operating at a given low bit rate for transmitting to the receiver a first digital signal representative of the frequency information content of the speech signal, the other channel including an envelope detector coupled to said input means, a low-pass filter coupled to said detector, and a second transmission device means coupled to said filter and operating at an appreciably lower bit rate than said first transmission device for transmitting to the receiver a second digital signal representative of the amplitude information content of the speech signal, said receiver comprising input means for receiving and separating said first and second digital signals, two receiving channels coupled to said separating means, one of said channels comprising a decoder means which in response to the applied second digital signal produces

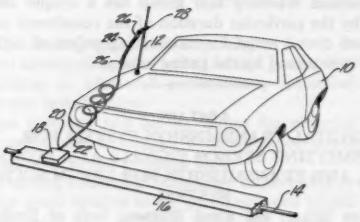
an output signal corresponding to the envelope of the speech signal, the other receiving channel comprising a pulse modulator to which the first digital signal and the said envelope signal as a modulating signal are applied, an integrator which is coupled to the output of the pulse modulator, and a band-pass filter coupled to said integrator, said first transmission device means comprising a uniform pulse delta modulator, said transmitter further including a differentiator coupled to said transmitter input means, an amplitude slicer coupled to said differentiator, and an integrator means coupled to said slicer for supplying the band-limited speech signal to said uniform pulse delta modulator for generating said first digital signal.

4,047,109

DRIVE-IN THEATER AUDIO SYSTEM

Kiichi Sekiguchi, 1-6-50-401 Akabanedai, Kitaku, Tokyo, Japan

Filed Sept. 9, 1975, Ser. No. 611,635
Claims priority, application Japan, Sept. 10, 1974, 49-103523
Int. Cl.² H04H *1/00*
U.S. Cl. 325—54 **4 Claims**



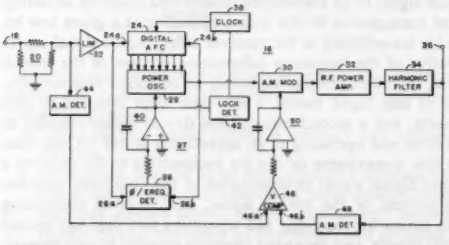
1. In a system for use in a drive-in theater for reproducing audio sound in plurality of vehicles having broadcast band radio receivers including a central broadcast band transmitter and a wired circuit connected to the output of the transmitter and extending in the vicinity of the vehicles, an improved form of lead-in for connecting the wired circuit to the radio receiver of a vehicle, comprising: a pair of elongated, flexible conductor sections supported in closely spaced parallel relationship to one another, and insulated from one another, one of the conductors being connected to the said wired circuit and the other conductor being connected to the antenna circuit of the vehicle radio to capacitively couple a transmitter signal to the vehicle radio without strong coupling of other broadcast band signals.

4,047,110

TRANSMITTER COUPLED ACTIVE FILTER

Eugene A. Janning, West Chester, Ohio, assignor to Xetron Corporation, Cincinnati, Ohio

Filed July 1, 1976, Ser. No. 701,540
Int. Cl.² H04B *1/04*
U.S. Cl. 325—123 **21 Claims**



1. In a transmission system, the combination comprising: an R.F. transmitter having a high power original carrier output with signal modulations and broadband noise thereon;

means for dissipating said high power original carrier output to a relatively low level;

a tunable power oscillator for regenerating said carrier, said oscillator having a low noise output;

comparison circuit means for comparing said lower level original carrier with said regenerated carrier and for automatically tuning said power oscillator to the frequency of said original carrier in response to a difference between said carriers, said comparison circuit means including means responsive to said low level original carrier to derive a voltage proportional to said signal modulations for modulating said oscillator; and

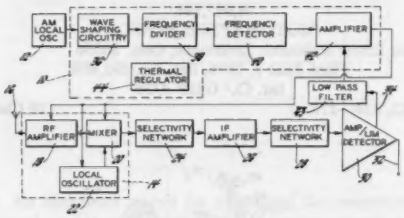
means for amplifying the output of said power oscillator to a predetermined high power level.

4,047,111

TUNING SYSTEM FOR AM/FM RECEIVERS

Paul N. Barr, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed July 19, 1976, Ser. No. 706,848
Int. Cl.² H04B *1/16*
U.S. Cl. 325—315 **4 Claims**



1. In a combination AM and FM receiver including an AM local oscillator, electronically tunable FM tuner means, and automatic frequency control means providing a first DC signal having an amplitude proportional to drift of said FM tuner, the improvement comprising a circuit for detecting the frequency of said AM local oscillator and for supplying a tuning voltage to said FM tuner, said circuit comprising amplifier means for amplifying the AC input from said AM local oscillator for providing a trigger signal each half cycle of said AC input, frequency divider means responsive to said trigger signal for producing a square wave signal at one half the frequency of said local oscillator signal, frequency detector means responsive to the output of said frequency divider means for developing a second DC signal having an amplitude proportional to the frequency of said AM local oscillator, DC amplifier means responsive to said first and second DC signals for supplying to said tuner a voltage which is an amplified version of said first DC signal, adjusted to compensate for any drift of said tuner.

4,047,112

CHANNEL SELECTOR EMPLOYING VARIABLE CAPACITANCE ELEMENTS FOR TUNING

Yoichi Sakamoto, Toyonaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 194,998, Nov. 2, 1971, abandoned, which is a continuation of Ser. No. 853,165, Aug. 26, 1969, abandoned. This application Mar. 11, 1974, Ser. No. 449,757
Claims priority, application Japan, Aug. 30, 1968, 43-62206; Oct. 1, 1968, 43-72072; Oct. 1, 1968, 43-72073; Oct. 3, 1968, 43-72104; Dec. 4, 1968, 43-88865; Feb. 21, 1969, 44-13099
Int. Cl.² H04B *1/16*
U.S. Cl. 325—455 **8 Claims**

2. A television receiver channel selector for selecting one

from among a plurality of channel tuning frequencies, comprising:

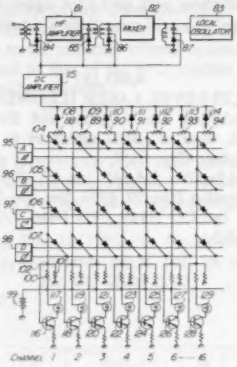
a tuning circuit tunable to said plurality of channel tuning frequencies, including variable capacitance diodes as tuning elements;

a plurality of preset voltage supply circuits, including preset impedances, for supplying at outputs thereof tuning voltages corresponding to said plurality of channel tuning frequencies;

binary memory circuit means having a plurality of outputs for producing binary coded information signals indicating pure binary numbers and corresponding to said channel tuning frequencies;

binary decoder means having a first plurality of terminals coupled to the corresponding outputs of said binary memory circuit means and a second plurality of terminals coupled to the outputs of said voltage supply circuits;

means for selectively connecting the outputs of said voltage supply circuits to said variable capacitance diodes for



tuning said tuning circuit to one of said channel tuning frequencies, including means for selectively connecting the output of one of said voltage supply circuits to said variable capacitance diodes to tune said tuning circuit to the corresponding channel tuning frequency and disconnecting the outputs of all others of said voltage supply circuits from said variable capacitance diodes, the selective connection of one said voltage supply circuit and disconnection of said all other voltage supply circuits being controlled by a signal appearing on a given one of said second plurality of decoder means terminals;

a plurality of switching elements having control terminals respectively connected to said second plurality of terminals of said binary decoder means, the corresponding one of said switching elements being urged conductive by said signal appearing at said given one of said second plurality of decoder terminals; and

a plurality of indicating means connected in series with the respective switching elements.

4,047,113

FEEDBACK CIRCUITRY FOR CHARGE DIGITIZER

Karl Stuermer, Mentor, Ohio, assignor to Sheller-Globe Corporation, Cleveland, Ohio

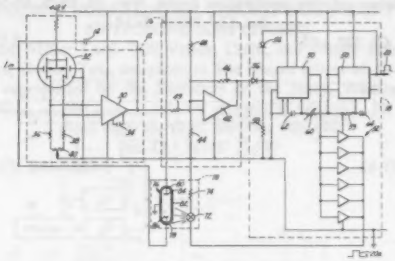
Filed May 13, 1976, Ser. No. 686,044

Int. Cl.[2] G01R *19/26*; H01J *39/12*

U.S. Cl. 328—2 **3 Claims**

1. In a charge digitizer wherein the current to be measured is applied to an electronic integrator which includes capacitor means, high input impedence amplifier means, and wherein the output from the integrator is applied to a comparator, and wherein the comparator gates a multivibrator to produce pulses responsive to the output from the comparator, an improved feedback circuitry comprising,

a vacuum photo-diode coupled between the input of the integrator and a biasing voltage for the photo-diode, and a pulse light source connected to the output of the multivibrator and operative responsive to pulses therefrom, said



light source being positioned to illuminate the cathode of the photo-diode to cause pulse current flow to discharge the capacitor means when the light source is illuminated, and guard ring means on said photo-diode to prevent unintended current flow between the anode and cathode, whereby an open feedback circuit is maintained during the absence of light pulses.

4,047,114

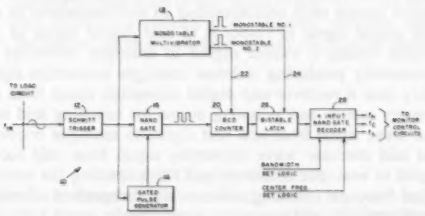
DIGITAL DETECTOR

Richard A. Lane, Huntsville, Ala., and Donald K. Fronek, Sparks, Nev., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 6, 1976, Ser. No. 712,427

Int. Cl.[2] H03K *9/06*

U.S. Cl. 328—140 **5 Claims**



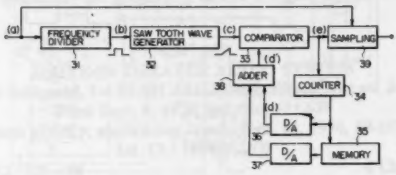
1. A digital detector for detecting the presence of selected frequencies in an input signal comprising: counting means having an input and an output; a NAND gate having first and second inputs and an output, said output being coupled to said counting means input; shaping means having an input for receiving said input frequency signals and an output for providing a shaped gating pulse, the output of said shaping means being coupled to the first input of said NAND gate; a pulse generator having an output coupled to said second NAND gate input and having a gating input coupled to said shaping means output; and a decoder circuit coupled to said counter output for responding to said counter output to provide output pulses as a function of said detector input frequencies.

4,047,115

SAMPLE PULSE GENERATING APPARATUS

Koichi Toda, Isehara; Tetsuya Miki, and Haruo Yamaguchi, both of Yokosuka, all of Japan, assignors to Anritsu Electric Co., Ltd. and Nippon Telegraph and Telephone Public Corporation, both of Tokyo, Japan

Filed Nov. 19, 1976, Ser. No. 743,347
Claims priority, application Japan, Nov. 21, 1975, 50-139993
Int. Cl.[2] H03K 5/18
U.S. Cl. 328—151 **2 Claims**



1. A sample pulse generating apparatus having means for generating an input signal with a high frequency to be sampled; means upon receipt of said input signal for generating a saw tooth wave signal which is in synchronism with said input signal and has lower frequency than that of said input signal; means for generating a staircase wave signal of which the voltage level is stepped up in synchronism with the occurence of said saw tooth wave signal; a voltage comparator for receiving said saw tooth wave signal and said staircase wave signal and comparing them and producing a sampling signal when those signals coincide in level with each other; and means for producing an observation signal which is analogous in wave shape to said input signal and has lower frequency than that of said input signal, by sampling said input signal by said sampling pulses, the improvement in which said staircase wave signal generating means includes a counter means for executing a count every time when it receives said sampling pulse from said comparator and a first digital to analogue converter for successively producing staircase signals every time it receives a digital counting output signal generated from said counter means, and said sample pulse generating apparatus further comprises: memory means for previously storing in the order of said saw tooth wave signal generation the signals each with the magnitude corresponding to the time error of said each sampling pulse occurrence due to the non-linearity of said saw tooth wave signal and for successively generating digital correction signals each corresponding to said magnitude of said each stored signal in response to said digital signal of said counter means; a second digital to analogue converter for successively producing staircase analogue correction signals every time it receives said digital correction signal from said memory means; and summing means for summing said staircase wave signal from said first digital to analogue converter and said staircase wave correcting signal from said second digital to analogue converter and for outputting the summed signal from said summing means to said comparator where it is compared with said saw tooth wave signal.

4,047,116

FM MULTIPLEX STEREO DEMODULATING CIRCUIT

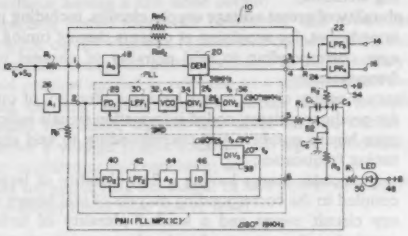
Minoru Ogita, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Aug. 24, 1976, Ser. No. 717,389
Claims priority, application Japan, Aug. 28, 1975, 50-103429
Int. Cl.[2] H03D 3/00; H04H 5/00
U.S. Cl. 329—124 **6 Claims**

2. An FM multiplex stereo demodulating circuit for obtaining separated left and right channel signals from a composite signal containing a modulated stereophonic signal and a pilot signal of a certain frequency comprising:

a demodulator circuit having an input and first and second output signals comprising said separated left and right channel signals;

means for connecting said modulated and pilot signal to said input;



means for receiving said modulated and pilot signals and producing a cancellation signal which is identical to and 180° out of phase with said pilot signal; and

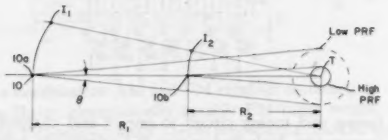
means for applying said cancellation signal to said input.

4,047,117

MULTI-LEVEL LASER ILLUMINATOR

Harold J. Tuchyner, Los Angeles, and Robert C. Benson, Canoga Park, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 434,145, Jan. 17, 1974, abandoned. This application Dec. 27, 1976, Ser. No. 754,285
Int. Cl.[2] H01S 3/00; F41G 7/00
U.S. Cl. 330—4.3 **11 Claims**



1. A laser target illuminator comprising

laser oscillator means for generating high power pulses and low power pulses,

a first control source coupled to said laser oscillator means for generating said high power pulses at a first pulse rate,

a second control source coupled to said laser oscillator means for generating said low power pulses at a second pulse rate higher than said first pulse rate, and

optical means responsive to said laser oscillator means to transmit a combined pulse train toward said target.

4,047,118

TRANSISTOR AMPLIFIER CIRCUIT

Yoshio Sakamoto, and Yasuo Kominami, both of Kokubunji, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 16, 1976, Ser. No. 649,745
Claims priority, application Japan, Jan. 16, 1975, 50-6271
Int. Cl.[2] H03F 3/04
U.S. Cl. 330—22 **16 Claims**

1. In a transistor amplifier circuit having

an input terminal to which signals to be amplified are applied;

an output terminal;

a common-emitter transistor having its base electrode connected to said input terminal and its collector electrode connected to said output terminal;

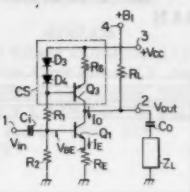
a power supply terminal to which a power supply voltage is applied; and

a constant-current circuit connected between said power

supply terminal and the collector of said common-emitter transistor;

the improvement comprising:

means for setting a D.C. voltage level at the collector of said common-emitter transistor including a D.C. voltage terminal to which a prescribed D.C. voltage exclusive of said power supply voltage is applied, and



a load resistor connected between said D.C. voltage terminal and the collector of said common-emitter transistor, and

wherein the value of current supplied by said constant-current circuit to the collector of said common-emitter transistor is equal to that of the D.C. emitter current of said common-emitter transistor.

4,047,119

TRANSISTOR DIFFERENTIAL AMPLIFIER CIRCUIT

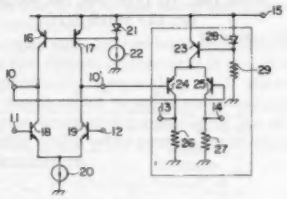
Yoshito Ohmura, Hachio; Takahiro Okabe, and Hiroshi Morozumi, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 24, 1976, Ser. No. 660,819

Claims priority, application Japan, Feb. 26, 1975, 50-22890

Int. Cl.² H03F *3/45*

U.S. Cl. 330—30 D **23 Claims**



15. A transistor differential amplifier circuit for producing pulse output signals from A.C. input signals comprising at least a first amplifier stage comprising:

a pair of amplifying transistors of a first conductivity type connected to each other by their emitters;

means for applying A.C. input signals between the bases of said amplifying transistors;

first constant current means commonly connected to both the emitters of said first amplifying transistors;

means for deriving output pulse signals from the collectors of said amplifying transistors;

a pair of load transistors of second conductivity type each connected by the collector thereof with the collector of a respective one of said amplifying transistors and having their bases and emitters commonly connected to each other;

diode means connected between the commonly connected bases and emitters of said load transistors for providing a voltage drop produced thereacross between the base and emitter of each of said load transistors; and

second constant current means connected to said diode means for providing said diode means with a constant current;

wherein said first and second current sources are adjustable such that the duty cycle of said output pulse signals is related to the ratio of the magnitude of said first and second current sources.

4,047,120

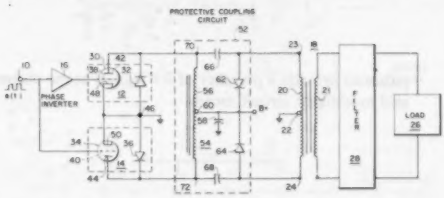
TRANSIENT SUPPRESSION CIRCUIT FOR PUSH-PULL SWITCHING AMPLIFIERS

Harold Wilbur Lord, Mill Valley, Calif., and Jimmy Dale Rogers, Dallas, Tex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 15, 1976, Ser. No. 705,489

Int. Cl.² H03F *21/00*

U.S. Cl. 330—207 P **16 Claims**



1. A push-pull amplifier comprising:

first and second switching amplifier elements operating to alternately conduct an input signal for 180° intervals,

means for phase shifting the input signals to said first switching amplifier element 180° relative to the input signal of said second switching amplifier element,

an output transformer having a primary coil with first and second end terminals located at respective ends of the coil and a grounded center tap, said first end terminal being coupled to the output of said first switching amplifier element, said second end terminal being coupled to the output of said second switching amplifier element, and a secondary coil connected to a load,

A D.C. power source; and

protective coupling means connecting said D.C. power source to said first and second end terminals of said primary coil and the outputs of the first and second switching amplifier elements, said protective coupling means limiting the voltage level of said primary coil switching amplifier elements to inhibit high transient voltages caused during conductive switching of said amplifier elements.

4,047,121

RF SIGNAL GENERATOR

Kenneth J. Campbell, Solana Beach, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 16, 1975, Ser. No. 622,924

Int. Cl.² H04B *17/00*

U.S. Cl. 331—76 **5 Claims**

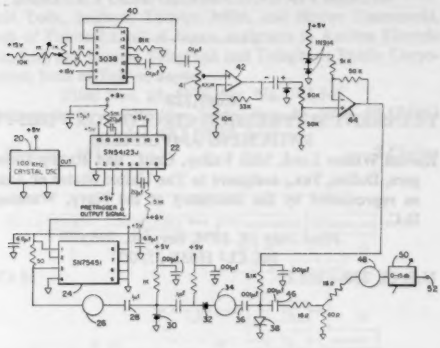
1. In a signal generator for generating modulated RF signals available for testing key parameters of receivers the combination comprising:

a. signal generating means for generating an output signal of a predetermined frequency;

b. pulse generating means coupled to said signal generating means for generating spike output pulses at said predetermined frequency;

c. balanced mixer modulator circuit means coupled to said pulse generator means;

d. a source of amplitude modulating signal means coupled to said modulator circuit means for modulating said narrow



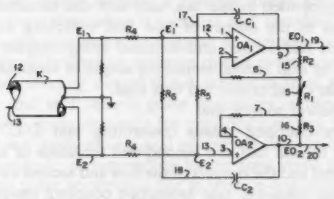
pulses to provide a plurality of RF signals at the output of said modulator circuit means.

4,047,122

FREQUENCY COMPENSATED DIFFERENTIAL AMPLIFIER

Dhulipala M. Rao, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 11, 1976, Ser. No. 656,993
Int. Cl.² H03F 1/36
U.S. Cl. 330—84 **1 Claim**



1. In a high impedance and high closed loop DC gain amplifier arrangement connected in circuit between two input terminals forming a differential input supplied with an analog signal and two output terminals, the combination of:

first and second operational amplifiers each having a non-inverting input, an inverting input and an output, the non-inverting inputs being connected to respective ones of said input terminals, the inverting inputs being connected to the opposite ends of an input resistor, the outputs being each connected to the associated inverting input through a corresponding output resistor and to a corresponding one of said output terminals to provide said closed loop DC gain;

with said input terminals being supplied with said analog signal together with an alternating current noise signal of a given frequency in the low frequency range;

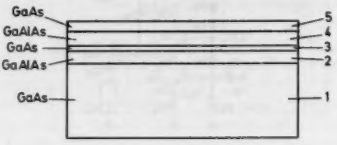
a first capacitor connected between the output of one operational amplifier and the non-inverting input of the other operational amplifier, a second capacitor connected between the output of the other operational amplifier and the non-inverting input of the said one operational amplifier, said first and second capacitors having a value providing at and above said given frequency and AC gain substantially lower than said DC gain.

4,047,123

DOUBLE HETEROSTRUCTURE LASERS HAVING REDUCED MICROSTRESS

Paul Anthony Kirkby, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,320
Claims priority, application United Kingdom, Sept. 26, 1974, 41896/74
Int. Cl.² H01S 3/19
U.S. Cl. 331—94.5 H **7 Claims**



1. An improved double heterostructure laser of the type having an active region consisting of Group III–V material flanked by at least one layer of Group III–V material comprising:

an additional Group III material within the active region composition for providing reduced microstress strain in the laser structure; and

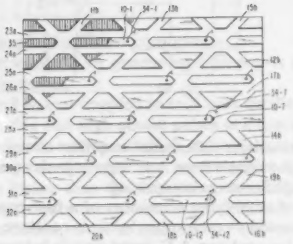
an additional Group III material within the Group III–V material of the flanking layers wherein the Group III material comprises gallium and the additional Group III material comprises indium.

4,047,124

PLANAR SOLID STATE LASER ARRAY

Liam David Comerford, Croton-on-Hudson, and Peter Stephen Zory, Jr., Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,851
Int. Cl.² H01S 3/19
U.S. Cl. 331—94.5 H **2 Claims**



1. A solid state laser array comprising:

a monolithic body having a plurality of planar layers of semiconducting materials including an active layer bounded by a pair of buffer layers operative when forward biased to produce a population inversion;

electrode structures on opposing faces of said body operative when potentialized to apply a forward bias to said active layer;

a plurality of grooves opening into one of the faces of said body and penetrating into said body to a depth equal to or greater than the depth of the lower buffer layer the said grooves dividing said body into a plurality of islands each of which is bounded by walls of said grooves to provide a resonant circulatory cavity;

a diffraction grating formed in a layer of said body for coupling the circulating laser beam out of each of said laser islands in a direction normal to the plane of said layers;

the said plurality of grooves consisting of first, second, and

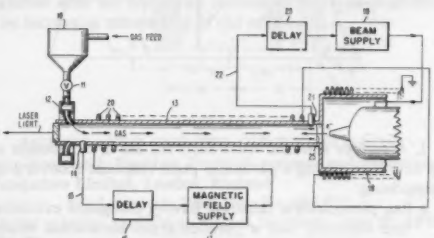
third sets of grooves, the grooves in the respective sets being parallel to one another, and the first and second sets of grooves being mutually perpendicular and equiangularly disposed with respect to the grooves in said third set, the grooves in said first and second sets having vertical walls and the grooves in said third set having nonvertical walls whereby the resonating cavity is defined by the walls of said first and second sets of grooves.

4,047,125

ELECTRON BEAM PUMPED GAS LASER

Russell Warren Dreyfus, Cross River, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 3, 1976, Ser. No. 682,865
Int. Cl.[2] H01S 3/09
U.S. Cl. 331—94.5 PE **18 Claims**



1. An electron beam pumped gas laser having an electron beam launching means in an evacuated cavity which is adapted to house a lasing gas which laser eliminates the requirement for apparatus to physically segregate the electron beam launching means from the lasing gas, which laser further comprises:

a reservoir of lasing gas, valve means connecting said cavity to said reservoir to allow said lasing gas to flow into said evacuated cavity, and

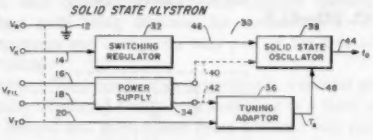
means to energize said electron beam launching means at a time when two distinct regions exist in said cavity, a first region immediately surrounding said electron beam launching means which is substantially evacuated and a second region containing a quantity of gas sufficient to support lasing action when pumped by an electron beam passing therethrough.

4,047,126

SOLID STATE KLYSTRON

Gary L. Anderson, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,705
Int. Cl.[2] H03B 5/18, 7/14, 9/12
U.S. Cl. 331—96 **34 Claims**



1. A solid state microwave generator for use in place of a low power tube-type klystron and operable from the klystron cathode and reflector voltage supplies comprising:

a. means for providing a cathode voltage;

b. means for providing a reflector voltage;

c. means responsive to said cathode voltage for reducing the voltage level of said cathode voltage to a first predetermined voltage;

d. tuning adapter means responsive to said reflector voltage for providing gain compensation to said reflector voltage; and

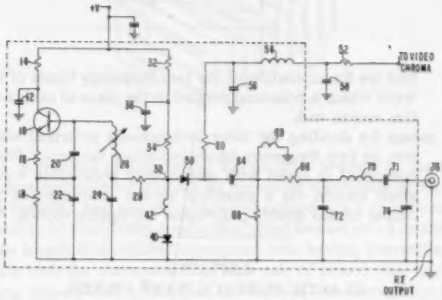
e. solid state oscillator means responsive to said first predetermined voltage and said gain compensated reflector voltage for generating an a-c output signal, said gain compensated reflector voltage determining the frequency of said a-c output signal.

4,047,127

RF OSCILLATOR AND MODULATOR HAVING REGULATED LOW HARMONIC OUTPUT

Wilson E. Alexander, Santa Clara, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Aug. 27, 1976, Ser. No. 718,279
Int. Cl.[2] H03C 1/14
U.S. Cl. 332—31 T **7 Claims**



1. An RF oscillator and modulator wherein said oscillator has a regulated output power for a range of supply voltage and low harmonic voltage output comprising:

a. a bipolar transistor having emitter, base and collector terminals,

b. a voltage source,

c. means connecting said transistor to said voltage source;

d. means connecting said transistor to circuit ground;

e. tuned circuit means operably connected with said transistor to establish oscillation frequency;

f. means interconnecting said tuned circuit means and an oscillator output terminal;

g. diode biasing means having a fixed DC voltage drop connecting said output terminal and circuit ground whereby said fixed DC voltage is commuted to said transistor through said tuned circuit as a bias voltage and

h. modulation means connected to said oscillator output terminal for receiving a modulation signal and modulating said oscillator signal.

4,047,128

SYSTEM FILTER FOR DOUBLE FREQUENCY UTILIZATION

Gunter Morz, Ludwigsburg, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

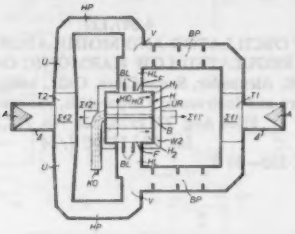
Filed Apr. 19, 1976, Ser. No. 678,387
Claims priority, application Germany, Apr. 19, 1975, 2517383
Int. Cl.[2] H01P 1/16, 5/20
U.S. Cl. 333—11 **14 Claims**

1. A system filter for separating signals of two different frequency bands with each frequency band being doubly orthogonally polarized whereby the same frequency can be used in two channels, said system filter comprising in combination:

a broadband polarization filter of singly symmetrical construction including a doubly polarizable waveguide section, partition means positioned within said waveguide for axially dividing said waveguide section into two symmetrical partial waveguides, and means for coupling out the two frequency bands of the wave which is polarized paral-

lel to the plane of said partition means including two coupling windows each formed in a respective one of a pair of oppositely disposed walls of said doubly polarizable waveguide section and at least one waveguide hybrid tee having two symmetrical arms coupled to said coupling windows;

diplexer means coupled to said at least one waveguide hybrid tee for separation of the two frequency bands of the wave which is polarized parallel to the plane of said partition means; and,



means for dividing the other orthoganally polarized wave into its two frequency bands including frequency filters connected in series with said doubly polarizable waveguide section via a transition section connected to the output of said doubly polarizable waveguide section.

4,047,129

ELASTIC SURFACE WAVE FILTER

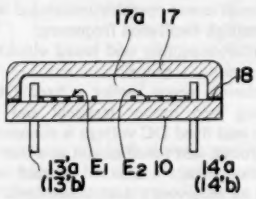
Hideki Ishiyama, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

Filed Mar. 12, 1976, Ser. No. 666,270

Claims priority, application Japan, Mar. 13, 1975, 50-34316[U]; Mar. 13, 1975, 50-34317[U]; Mar. 13, 1975, 50-34318[U]

Int. Cl.² H03H 9/04, 9/10, 9/26; H01L 41/04

U.S. Cl. 333—72 **11 Claims**



1. An elastic surface wave filter which comprises:

a substrate of peizoelectric property having opposed surfaces and interleaved-comb-type transducer electrodes formed on one of said opposed surfaces, one of said transducer electrodes being adapted to be coupled to a source of electric input signal and the other said transducer electrodes being adapted to be coupled to an external load circuitry, said transducer electrodes being formed on said one of said opposed surfaces of said piezoelectric substrate in spaced, but piezoelectrically coupled, relation to each other;

a top covering rigidly mounted on said one of said opposed surfaces of said piezoelectric substrate and defining an interior chamber between said top covering and said substrate;

each of said transducer electrodes including a pair of comb-type electrode arrays interleaved with each other; and

elongated terminal members one for each comb-type electrode array, each of said elongated terminal members having one end coupled to the associated comb-type electrode array and the other end extending outwardly from said substrate for external electrical connection.

4,047,130

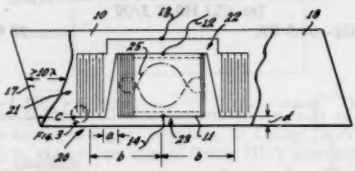
SURFACE ACOUSTIC WAVE FILTER

Teong C. Lim, Thousand Oaks, Calif.; Umit Tarakci, Balikesir, Turkey, and Carmine F. Vasile, Thousand Oaks, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 27, 1976, Ser. No. 718,249

Int. Cl.² H03H 9/04, 9/26, 9/32, 9/30

U.S. Cl. 333—72 **12 Claims**



1. A surface acoustic wave filter for use in connection with an amplifier having a particular pulse response recovery time, comprising:

a flat, piezoelectric substrate having elongated extension in one direction and a parallelogram elevational contour, there being a plurality of interdigitized fingers establishing at least two transducers respectively for transmitting and receiving acoustic surface waves propagating in the one direction, the wavelength of the passband center frequency being determined by the spacing on said interdigitized fingers, particular surface areas being free from these fingers adjacent to short side edges of the parallelogram, said edges having an angle of less than 90° relative to one direction;

a damping material covering at least a portion of the said surface areas for a width in the said direction equivalent to about ten wavelengths of the transmitted surface waves; and

the edge-to-edge spacing between the transducers being greater than about four wavelengths, the center-to-center spacing between the two transducers being smaller than one half the distance a surface wave propagates during said recovery time.

4,047,131

VOLTAGE-CONTROLLED HF-SIGNAL ATTENUATOR

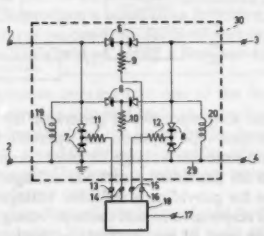
Adrianus Willem Ludikhuize, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 21, 1976, Ser. No. 688,534

Claims priority, application Netherlands, May 28, 1975, 7506265

Int. Cl.² H03H 7/24

U.S. Cl. 333—81 R **4 Claims**



1. An integrated voltage controllable RF signal attenuator

having a control range and a pair of signal input terminals and a pair of signal output terminals, said attenuator comprising a parallel arrangement of first and second signal transmission paths, both of said transmission paths being coupled between one of said signal input terminals and one of said output terminals; a signal shunting path coupled between the signal input terminals; said first transmission path comprising a first pair of PIN-diodes coupled in series opposition and having an RF impedance which depends on a first variable direct current; said signal shunting path comprising a second pair of PIN-diodes coupled in series opposition; and said second transmission path comprising a third pair of PIN-diodes coupled in series opposition and having an RF impedance which depends on a second variable direct current; the minimum signal impedance of the first transmission path being smaller than that of the second transmission path within the control range of the attenuator and the second variable direct current decreasing in magnitude after the first direct current decreases in magnitude for an increasing attenuation of the attenuator.

4,047,132

MULTILAYER PRINTED CIRCUIT BOARDS

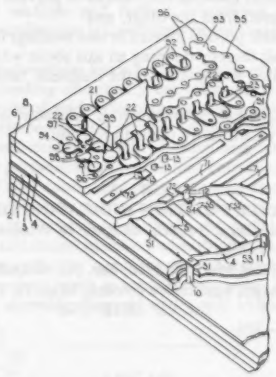
Ignacy Krajewski, Poynton, England, assignor to International Computers Limited, London, England

Filed June 21, 1976, Ser. No. 698,021

Claims priority, application United Kingdom, June 20, 1975, 26256/75

Int. Cl.² H01P 3/08

U.S. Cl. 333—84 M **7 Claims**



1. A multilayer printed circuit assembly including

a planar conductive layer;

a plurality of contact pads arranged in a first plane spaced from said conductive layer and parallel thereto, the contact pads being disposed for connection to circuit components and occupying only part of the area of said first plane;

a plurality of first conductors extending in a second plane;

a plurality of second conductors extending in a third plane, said second and third planes lying between said conductive layer and said first plane;

electrical connections between the contact pads and selected ones of said first and second conductors;

and a plurality of conductive areas occupying at least some of the remainder of the area of said first plane, being electrically connected to said conductive plane and being effective in conjunction with the conductive plane to cause the characteristic impedances of the first and second conductors to be approximately equal.

4,047,133

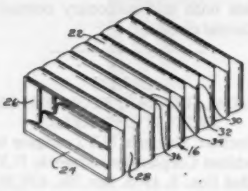
CONTINUOUS CORRUGATED WAVEGUIDE AND METHOD OF PRODUCING THE SAME

Michel Merle, Elmira, N.Y., assignor to Andrew Corporation, Orland Park, Ill.

Division of Ser. No. 397,955, Sept. 17, 1973, Pat. No. 3,938,244, which is a continuation-in-part of Ser. No. 315,101, Dec. 14, 1972, abandoned, which is a continuation of Ser. No. 235,161, March 16, 1972, abandoned, and Ser. No. 238,458, March 27, 1972, abandoned. This application Dec. 22, 1975, Ser. No. 643,369

Int. Cl.² H01P 3/14

U.S. Cl. 333—95 A **29 Claims**



1. A method of microwave transmission comprising transmitting microwaves through an elongated waveguide extending between two spaced points and comprising a continuous flat strip of electrically conductive metal formed into a continuous length of a coilable corrugated tube having intersecting walls with the currugations in each pair of intersecting walls being aligned with each other, the walls of one corrugation in each intersecting pair of corrugations being folded outwardly alongside the walls of the other corrugation in that pair beginning at the line of intersection of that pair of corrugations.

4,047,134

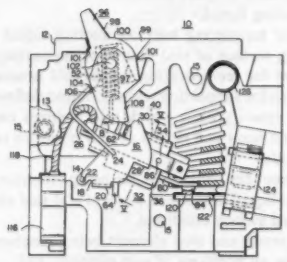
CIRCUIT BREAKER

Alfred E. Maier, Beaver Falls, and William I. Stephenson, Jr., Beaver, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 22, 1975, Ser. No. 579,756

Int. Cl.² H01H 73/48

U.S. Cl. 335—23 **12 Claims**



1. A circuit breaker, comprising:

an insulating housing;

an operating handle having open, closed, and trip positions;

a latch lever;

means pivotally attaching said latch lever to said housing;

a stationary contact;

a moving contact assembly pivotally attached to said latch lever, said moving contact assembly comprising a moving contact cooperable with said stationary contact to open and close an electric circuit;

an operating spring having one end pivotally connected to

said moving contact assembly and having another end engaged by said operable handle;

a latch member attached to said moving contact assembly and releasably engaging said latch lever, release of said latch lever allowing said moving contact assembly to pivot with respect to said latch lever, said pivoting movement causing said moving contact to separate from said stationary contact and open an electric circuit; and

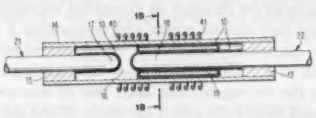
trip means operable upon overcurrent conditions through said moving and stationary contacts to effect automatic release of said latching lever by said latching member;

actuation of said operating handle between open and closed position being operable to pivot said latch lever and said moving contact assembly and cause said moving contact to cooperate with said stationary contact to open and close an electric circuit.

4,047,135
CYLINDRICAL, LINEAR, STOPLESS MERCURY SWITCH AND RELAY

Paul Edward Stuckert, Katonah, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,263
Int. Cl.² H01H *1/08*
U.S. Cl. 335—58 **13 Claims**



1. A fluid-conductor-wetted, linear relay switch including a housing,

a stationary contact electrode within said housing,

a reciprocable contact element,

a conducting liquid,

means for supporting said conducting liquid to provide a bearing surface of said liquid for supporting said contact element for reciprocation within said housing,

said means for supporting and said liquid defining a predetermined space within which said element can reciprocate between open and closed switch positions relative to said electrode,

said element and said electrode being electrically connected by said liquid when said element and said electrode are in a closed switch condition,

said electrode and said element being mechanically spaced apart in all positions of said element, and

said element being held apart by a predetermined minimum spacing from said electrode in said closed condition by said liquid,

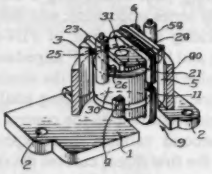
said element and said electrode having conforming electrical contact surfaces adapted for confrontation during sliding of said element into said closed condition, and in said closed condition

said conforming surfaces resting in side-by-side overlapping relationship with said liquid contained within the space between said conforming surfaces, said conforming surfaces extending parallel to the axis of reciprocation of said reciprocable contact element.

4,047,136
MOVING MAGNET TYPE INSTRUMENT

Seiichi Satto, Iruma, Japan, assignor to Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.), Higashimurayama, Japan

Filed May 11, 1976, Ser. No. 685,238
Claims priority, application Japan, May 13, 1975, 50-56858; May 21, 1975, 50-67975; June 10, 1975, 50-78490
Int. Cl.² H01F *7/08*
U.S. Cl. 335—222 **7 Claims**



1. Improvements in a moving magnet instrument in which a magnet member moves relative to a frame unit in response to variations in current flow through a coil fixed relative to the frame unit and relative to which the magnet member is rotatable arcuately in response to current flow variations through the coil, the improvement comprising:

the frame unit being of two piece construction capable of assembly into a unit, each piece having a bearing alignable with the other bearing upon assembly of the respective pieces;

the magnet member being formed with magnetic material and a plastic material interlocked to prevent separation of one material from the other, and

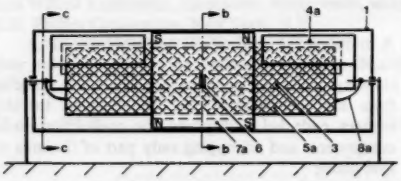
having an axle portion located in said bearings formed in said frame unit thereby defining an axis about which said magnet member is rotatable in the magnetic field of the fixed coil

whereby said magnet member is rotatable in response to current which flows through the coil.

4,047,137
BISTABLE POSITION INDICATING DEVICE

Birger Widén, Tierp, Sweden, assignor to Widéns Elautomatik AB, Tierp, Sweden

Filed Mar. 10, 1976, Ser. No. 665,408
Claims priority, application Sweden, Mar. 19, 1975, 7503123
Int. Cl.² H01F *7/08*
U.S. Cl. 335—234 **4 Claims**



1. An electromagnetic indicating display device including at least one pair of bistable position indicators, each bistable position indicator comprising: a non-rotatable electromagnet having a pair of pole shoes; an elongate rotatable member concentrically positioned relative to said electromagnet, the outer surface of said elongate member being circumferentially divided into first and second axially extending sections of different colors; a permanent magnet carried by said rotatable member having poles alignable respectively with the pole shoes of said electromagnet upon excitation of said electromag-

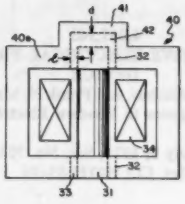
net whereby said rotatable member is rotatable through an angle of not more than 180° selectively into one of two positions, the first of said positions displaying one of said first and second colored sections and information carried thereon and the second of said positions displaying the other of said colored sections and information carried thereon.

4,047,138

POWER INDUCTOR AND TRANSFORMER WITH LOW ACOUSTIC NOISE AIR GAP

Robert L. Steigerwald, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 19, 1976, Ser. No. 688,010
Int. Cl.² H01F 27/24
U.S. Cl. 336—100 **2 Claims**



1. A low acoustic noise power inductive device for high operating frequency power inductor and transformer applications comprising

a ferrite magnetic core comprising an essentially rectangular outer member having opposing side sections and connecting end sections and further comprising a cylindrical center member that is continuous in the longitudinal direction,

said core end sections having a pair of aligned circular apertures extending completely therethrough into which opposite ends of said cylindrical center member extend to define between at least one end section and the respective end of said center member a radial magnetic air gap of constant predetermined length for controlling the permeability of said core, and a non-magnetic spacer mounted between said one end section and the respective end of said center member to maintain the radial air gap and support said center member, whereby the magnetic forces acting on said core members are radial and substantially sum to zero to result in low acoustic noise, and

a winding assembly disposed about said cylindrical center member.

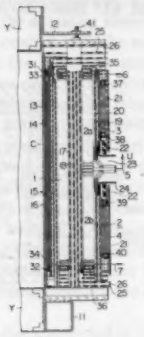
4,047,139

TRANSFORMERS OF LARGE CAPACITY FOR ULTRA-HIGH VOLTAGES

Teruo Fukuda, and Tetuo Otomo, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 16, 1976, Ser. No. 742,264
Claims priority, application Japan, Dec. 1, 1975, 50-142251
Int. Cl.² H01F 21/12
U.S. Cl. 336—150 **6 Claims**

1. A transformer of a large capacity for an ultra-high voltage comprising a core leg which is coaxially wound sequentially with at least a low voltage winding, a high voltage winding composed of an upper and a lower winding section, and an upper and a lower tap winding, said high voltage winding having a lead conductor led out from a center portion of said high voltage winding at which the opposite ends of said winding sections are connected to each other and having connection lead-out conductors taken out from top and bottom end portions of said high voltage winding, said lead conductor led out from the center portion of said high voltage winding extending to a terminal to be connected to a high voltage transmission line, said upper and lower tap windings being disposed vertically and being spaced from each other with a predetermined distance, said upper and lower sections of said high voltage winding being respectively connected to said upper and lower tap windings so that said upper and lower sections operate in a parallel relation to each other respectively through



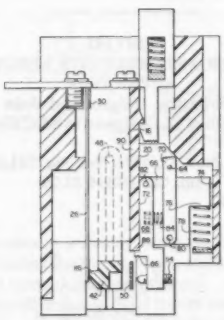
said upper and lower tap windings, wherein said upper and lower tap windings are disposed such that the magnetic center of each of said upper and lower tap windings is located at a height which corresponds to a value in a range of 55% to 65% of the height between said center portion and each end portion of said high voltage winding.

4,047,140

THERMAL OVERLOAD RELAY

Paul T. Anderson, and Stephen S. Dobrosielski, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 23, 1975, Ser. No. 643,719
Int. Cl.² H01H 71/16
U.S. Cl. 337—75 **11 Claims**



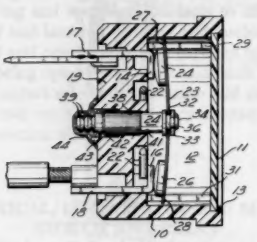
1. An electrical control device comprising a housing, a stationary contact, a movable contact, a slide within the housing for moving the movable contact between open and closed positions, a movable contact mounting arm on the slide, latch means on the slide for latching the slide in one of said positions, the slide being spring-biased in the other position, manual reset means for moving the slide to the latched position and comprising a reset rod, a plurality of pole units, each pole comprising a bimetal element responsive to current flow to effect heating thereof, and a crossbar associated with the bimetal elements to effect unlatching of the latch means.

4,047,141

CALIBRATION AND MOUNTING STRUCTURE FOR MOTOR CONTROLLERS OR THE LIKE

Ronald L. Holden, Mansfield, Ohio, assignor to Therm-O-Disc, Inc., Mansfield, Ohio

Filed Jan. 29, 1976, Ser. No. 653,538
Int. Cl.² H01H *61/00*
U.S. Cl. 337—89 **6 Claims**



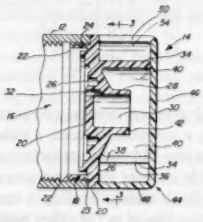
1. A control device comprising a molded plastic body formed with a bore, a bimetal snap element providing in its free state first and second positions of stability and operable in response to first and second predetermined temperatures thereof to snap between said positions, a mounting stud supporting said snap element on said body, said stud providing axially extending knurling intermediate its ends providing axially extending teeth, said teeth having a maximum radius greater than the radius of said bore initially formed in said body, said teeth being positioned within said bore and biting into the material of said body around said bore to provide high frictional engagement resisting axial movement of said stud with respect to said body, said body providing a counter-bore extending from the exterior of said body to said bore having a diameter at least substantially as large as the maximum diameter of said teeth, said stud providing radially and peripherally extending surfaces, and potting material extending into said counter-bore around said stud mechanically interlocking with said radially and peripherally extending surfaces cooperating with said frictional engagement to resist movement of said stud with respect to said body.

4,047,142

BREATHER ASSEMBLY FOR ELECTRICAL APPARATUS

Joseph Bernatt, Arlington Heights, and John E. Guleserian, Prairie View, both of Ill., assignors to S&C Electric Company, Chicago, Ill.

Filed Nov. 11, 1976, Ser. No. 741,023
Int. Cl.² H01H *85/20*
U.S. Cl. 337—186 **10 Claims**



1. A breather assembly for permitting atmospheric venting to the interior of electrical apparatus comprising:

a first chamber means for communicating with the interior of the apparatus;

a second chamber means for communicating with said first chamber means;

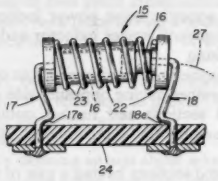
a third chamber means for communicating with said second chamber means and with the atmosphere in such a manner that moisture cannot flow directly in a straight line from the atmosphere to said first chamber irrespective of the positional orientation of the apparatus whereby moisture is prevented from entering the apparatus but the atmosphere is freely vented thereto.

4,047,143

FUSED RESISTIVE ELECTRICAL PROTECTION DEVICE

David M. Burden, Columbus, and Frank N. Malaney, Pataskala, both of Ohio, assignors to Western Electric Company, Inc., New York, N.Y.

Filed July 9, 1976, Ser. No. 703,875
Int. Cl.² H01H *85/36*
U.S. Cl. 337—239 **16 Claims**



1. A protective device comprising:

fusible means capable of at least establishing a weakened condition along an electrical circuit-path-defining dimension thereof when subjected to a specified current-induced over-load condition:

biasing means;

insulative enclosure means for said fusible means including a substantially tubular member having one fixedly secured and apertured end wall, and being adapted to provide an abutment for one end of said biasing means, and further including a movable apertured end wall adapted to normally substantially enclose the end of said tubular member opposite said secured end wall thereof, and to confine said biasing means between said movable end wall and said abutment of said tubular member; and

conductive terminating means respectively secured to the ends of the circuit-path-defining dimension of said fusible means, and being adapted to pass through the apertures of, and to be brought into firm engagement with, the outer surfaces of the respectively adjacent secured and movable end walls such that said movable end wall is normally positioned against te adjacent end of said tubular member, in opposition to a predetermined degree of compressive force imparted thereagainst by said biasing means, but with said latter force being sufficient, in response to said fusible means being subjected to a given overload condition, to physically separate sad fusible means into two sections along the resultant weakened region thereof by displacing said movable end wall, together with that portion of the associated terminating means in engagement therewith, and that section of the sub-divided fusible means associated therewith, a predetermined increased distance relative to said tubular member.

4,047,144

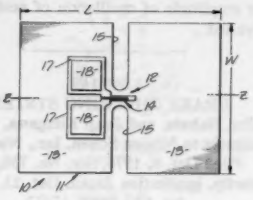
TRANSDUCER

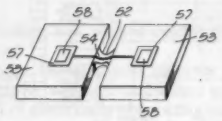
Herbert Vernon Wong, San Francisco, Calif., assignor to Becton, Dickinson Electronics Company, San Juan Capistrano, Calif.

Continuation of Ser. No. 158,618, June 30, 1971, abandoned, which is a continuation of Ser. No. 802,595, Feb. 26, 1969, abandoned. This application Aug. 15, 1975, Ser. No. 605,120

Int. Cl.² G01L *1/22*

U.S. Cl. 338—2 **13 Claims**





1. In an electromechanical transducer unit:

a substrate support body of semiconductive material having a first type of conductivity and having two pads separated by an intermediate reduced neck, and

a lineal resistor in the reduced neck of the substrate support body said resistor being composed of semiconductive material having a second type of conductivity, the electrical resistance of the lineal resistor varying with the relative displacement of the pads of the substrate support body, and

two relatively movable members secured to the respective pads for displacing one of the pads relative to the other.

4,047,145

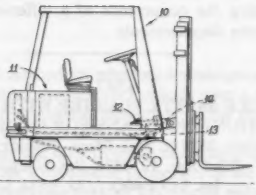
PIVOTALLY ACTUATED SPEED CONTROL MEANS OF AN APPARATUS

Richard A. Schwehr, Mentor, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed May 3, 1976, Ser. No. 682,814

Int. Cl.² H01C *13/00*

U.S. Cl. 338—67 **6 Claims**



1. In apparatus having a power source, an accelerating element, and control means connected to the accelerating element for varying the speed of the apparatus in response to movement of the accelerating element, said control means having a start switch having an actuating means, a bypass switch having an actuating means, and a potentiometer having a pivotally movable control element, each of said switches and potentiometer being associated with the accelerating element and controllable in response to movement of the accelerating element, the improvement comprising:

an actuating element being pivotally movable between a first position at which the actuating element is spaced from the bypass switch, in contact with the actuating means of the start switch, and the actuating means of the start and bypass switches are open and a second position at which the actuating element is spaced from the start switch, in contact with the actuating means of the bypass switch, and the actuating means of the start and bypass switches are closed, said actuating means of the start switch being at the closed position and said actuating means of the bypass switch being at the open position in response to the actuating element being at intermediate positions;

means for connecting the actuating element to the accelerating element, said actuating element being pivotally movable in response to movement of the accelerating element; and

a tie bar having one end connected to the pivotally movable control element of the potentiometer and the other end connected to the actuating element at locations sufficient for controllably moving the control element and controlling the potentiometer in response to movement of the tie bar by the actuating element.

4,047,146

VARIABLE RESISTOR ASSEMBLY

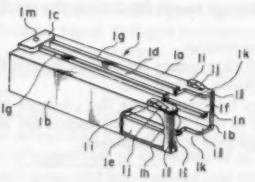
Fumimasa Takeyama, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1976, Ser. No. 717,901

Claims priority, application Japan, Jan. 14, 1976, 51-3042[U]; Jan. 14, 1976, 51-3043[U]; Jan. 14, 1976, 51-3044[U]; Jan. 14, 1976, 51-3045[U]

Int. Cl.² H01C *10/38*

U.S. Cl. 338—176 **8 Claims**



1. A variable resistor assembly comprising:

an elongated casing having one open end and a longitudinal slot formed through one wall thereof;

a plug member detachably fixed to the casing to close the open end thereof, the plug member having a shield plate extending therefrom coextensive with the interior of the casing;

a slider member formed with a slot through which the shield plate of the plug member slidingly extends, a handle extending from a first side of the slider member through the longitudinal slot of the casing and a slider contact extending from a second side of the slider member which is opposite to the first side thereof; and

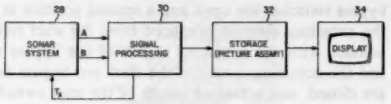
a resistance member disposed between the second side of the slider member and the casing and being formed with a resistance element with which the slider contact slidingly engages.

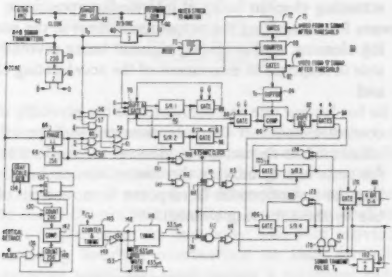
4,047,147

DUAL BEAM SONAR DISPLAY SYSTEM

Kenneth E. Wood, and James T. O'Farrell, both of Annapolis, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 2, 1976, Ser. No. 710,969
Int. Cl.[2] G01S *9/68, 7/62*
U.S. Cl. 340—3 R **14 Claims**





1. A dual sonar display system comprising:

A. sonar means for producing 1st and 2nd fan shaped beams and for scanning them in overlapping relationship in respective 1st and 2nd directions;

B. said sonar means being operable to provide a 1st set of beam signals from said first beam, indicative of targets in respective adjacent beam positions and a 2nd set of beam signals from said 2nd beam, indicative of targets in respective adjacent beam positions;

c. 1st storage means for storing target indications from said 1st set of beam signals;

D. means for comparing each beam signal from said 2nd set with all the beam signals from said 1st set, for target coincidence;

E. 2nd storage means for storing the results of said comparison;

F. display means;

G. 3rd storage means for storing signals for presentation on said display means; and

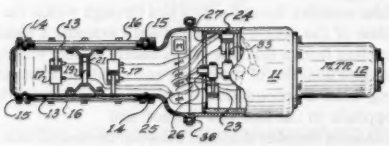
H. means for transferring the contents of said 2nd storage means to said 3rd storage means for assembly of a complete picture to be displayed.

4,047,148

PISTON TYPE UNDERWATER SOUND GENERATOR

Julius Hagemann, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 29, 1956, Ser. No. 568,682
Int. Cl.[2] H04B *13/00*
U.S. Cl. 340—12 R **3 Claims**



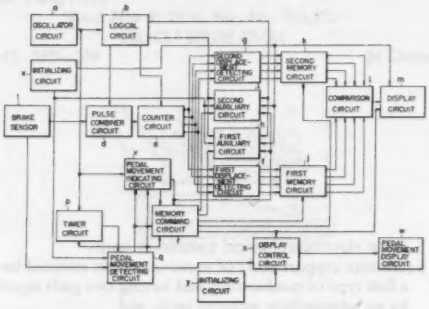
1. An apparatus for producing low frequency compressional waves under water which comprises two circular plates spaced in opposed parallel relation, a plurality of reciprocating fluid motors arranged in parallel between said plates, an independent fluid pump hydraulically connected to each of said motors for driving the same, a by-pass valve for each motor adjustable to vary the length of the stroke of such motor, a prime mover coupled to drive all of the pumps in synchronism, whereby the motors connected thereto reciprocate in unison to move said plates toward and away from each other at a frequency corresponding to the speed of the prime mover, and means for adjusting all of the by-pass valves in assembly, whereby the amplitude of oscillation of said plates in correspondingly varied.

4,047,149

BRAKE CHECKING SYSTEM

Sigeyuki Akita, Nukata, and Junji Kitagawa, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Oct. 8, 1976, Ser. No. 730,718
Claims priority, application Japan, Oct. 13, 1975, 50-123661
Int. Cl.[2] B60T *17/22*
U.S. Cl. 340—52 B **9 Claims**



1. A brake checking system for a vehicle comprising:

a. a brake sensor disposed to produce an output signal having a frequency corresponding to the displacement of a brake pedal of a vehicle;

b. a detection circuit including first and second displacement detecting circuits connected to said brake sensor and responsive to the output signal of said brake sensor for respectively detecting a maximum displacement of said brake pedal during first and second movements thereof, respectively;

c. a comparison circuit connected to said detection circuit for comparing the maximum displacements detected by said displacement detecting circuits to produce a signal corresponding to the difference between said maximum displacements; and

d. a display circuit connected to said comparison circuit and responsive to the signal from said comparison circuit for indicating the occurrence of a difference between said maximum displacements.

4,047,150

BICYCLE SAFETY FLASHER WITH OPTIONAL MOUNTING MEANS FOR OTHER USES

Dale T. Kelley, 2329 N. 39th Place, Phoenix, Ariz. 85008

Filed Apr. 12, 1976, Ser. No. 676,065
Int. Cl.[2] B60Q *1/30;* B62J *5/00*
U.S. Cl. 340—84 **6 Claims**

1. In a safety flasher having a lamp with terminals connected through a circuit to a battery, the improvements comprising:

a lens;

reflector means having said lamp and terminals mounted thereon for reflecting light from said lamp through said

lens, said lens being removably mounted on said reflector means;

printed circuit board means for providing said circuit and having terminations for connection to said terminals;

battery case means for receiving said battery;

means for connecting said printed circuit board means to said battery; and

fastening means for fastening said reflector means to said battery case means, said fastening means serving an additional function of electrically connecting said terminals to said terminations to complete said circuit for said lamp.

4,047,151

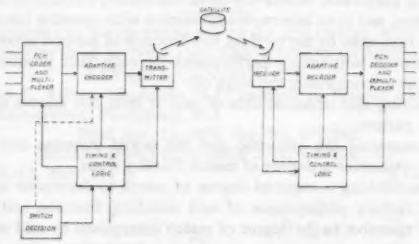
ADAPTIVE ERROR CORRECTING TRANSMISSION SYSTEM

Nils R. C. Rydbeck, Vildanden J101, and Carl-Erik Wilhelm Sundberg, Vildanden C506, both of 22234 Lund, Sweden

Continuation-in-part of Ser. No. 536,182, Dec. 24, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 644,804

Int. Cl.[2] G06F *11/12*

U.S. Cl. 340—146.1 AX **10 Claims**



1. An improved method for adapting transmission of analog information by digital modulation methods over a channel to variations in the transmission properties of the channel, the method including the steps of:

producing at least one control signal containing information indicative of the transmission properties of the channel;

using a first source code without introduced redundancy in the digital symbols thereof and with a first number of quantization levels in response to a said control signal for transmission of the information over the channel when the transmission properties are good; and

switching over to a second source code protected by an error-protecting code with introduced redundancy in the digital symbols thereof for transmission of the information over the said channel in response to said control signal when the transmission properties are poorer;

wherein said second source code has a number of quantization levels sufficiently smaller than that of the first source code such that the transmission speed is maintained after switching over from said first to said second source codes in spite of the introduced redundancy in the digital symbols transmitted over the said channel.

4,047,152

ELECTRONIC CHARACTER-READING SYSTEM

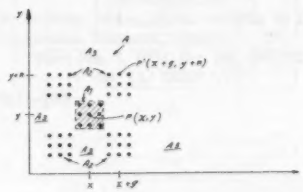
Ercole Giuliano, Genova; Orazio Paita, La Spezia, and Luigi Stringa, Arenzano-Genova, all of Italy, assignors to Elettronica San Giorgio - ELSAG - S.p.A., Genova-Sestri, Italy

Filed Nov. 3, 1976, Ser. No. 738,456

Claims priority, application Italy, Nov. 3, 1975, 69715/75

Int. Cl.[2] G06K *9/00*

U.S. Cl. 340—146.3 AG **15 Claims**



1. A method of electronically reading characters on a carrier moving unidirectionally past a set of photoelectric transducers positioned to scan the carrier surface along a line substantially perpendicular to the direction of carrier motion, said transducers generating individual signal voltages commensurate with the brightness of respective elemental areas of the carrier surface optically registering therewith at a given instant, comprising the steps of:

establishing a succession of operating cycles of a duration so chosen that the advance of said carrier during each cycle is on the order of magnitude of the width of an elemental area as measured along said line, each of said cycles being divided into a multiplicity of phases;

deriving from said signal voltages and from a reference voltage a set of electrical quantities representative of image contrasts existing at said elemental areas;

storing, during each phase, the electrical quantities derived from the signal voltages of a plurality of said transducers optically registering with a two-dimensional array of elemental areas on said carrier, said array including a first zone containing a central elemental area and a second zone composed of several peripheral elemental areas;

separately weighting different groups of stored electrical quantities, relating to elemental areas of said first zone and of said second zone, with a contrast-enhancing field function; and

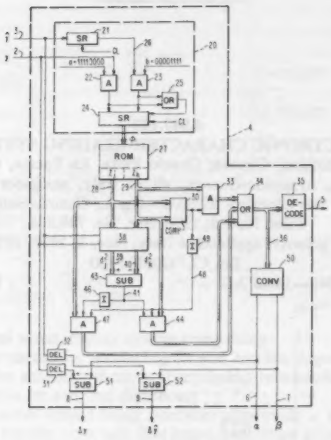
evaluating the most significant electrical quantity stored during any phase, relating to said central elemental area, together with a response parameter synthesized from the weighted electrical quantities to produce a binary output signal.

4,047,153

STATISTICAL DATA DETECTION METHOD AND APPARATUS

Philippe Emmanuel Thirion, Saint-Paul-de-Vence, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 6, 1976, Ser. No. 747,767
Claims priority, application France, Dec. 9, 1975, 75.38562
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 AQ 7 Claims



1. A method for the decoding of data received in a synchronous data transmission system wherein a transmitted signal is varied in at least two characteristics to be representative of a transmitted data symbol, said method being characterized in that it includes the following steps:

a. sampling each of said characteristics of said signal at a signal receiving location;

b. forming a multipart character for each of said samples, each character having a more significant part and a less significant part;

c. forming an address with the more significant part of each of the two characters associated with a symbol;

d. addressing a storage table with said address, said storage table at each address storing an identification of at least two data symbols, said identifications being the same where the combined major parts of said characters unequivocally identify a transmitted data symbol and being different where said combined major parts may be formed for either of two almost equally probable transmitted data symbols, to read out the addressed word of said table;

e. comparing the two readout identifications;

f. selecting one identification as the identification of the transmitted symbol when said symbol is unequivocally identified;

g. comparing all of both of said characters for a received signal with said characteristics for both of said identified transmitted data symbols when said identifications are different to select the more probable one of said identifications; and

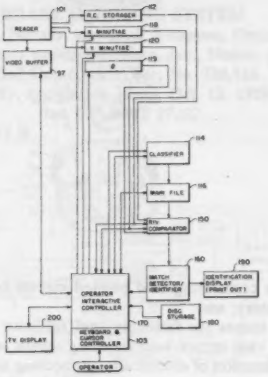
h. decoding the selected identification to determine said transmitted data symbol.

4,047,154

OPERATOR INTERACTIVE PATTERN PROCESSING SYSTEM

Visvaldis A. Vitols, Orange, and John P. Riganati, Yorba Linda, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 10, 1976, Ser. No. 722,306
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 E 35 Claims



1. An interactive method for performing a succession of processing functions in relation to an unknown pattern to extract minutiae data therefrom uniquely identifying the pattern for subsequent comparison with minutiae data corresponding extracted from at least one known such pattern to determine a match therebetween, said processing functions being performed selectively in an automatic, continuous succession, and in an interrupted succession with operator interaction requested by the method, as a function of method determination of satisfactory performance of each said processing function, comprising the steps of:

storing said minutiae data of said at least one known such pattern,

comparing the extracted and the stored minutiae data to determine a degree of match therebetween,

establishing a required degree of match to determine satisfactory performance of said matching function and responsive to the degree of match determined by said comparing step to request operator interaction when said required degree of match is not satisfied, and to identify the given pattern as the known pattern for which the required degree of match is satisfied,

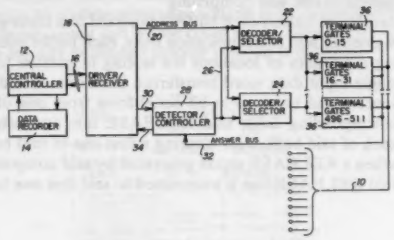
selectively displaying the given pattern in response to an operator interaction request and for selectively displaying the automatically extracted minutiae data in superposed relationship thereon, and

providing manually operable means for selectively correcting and supplementing the automatically extracted minutiae data to enable said comparing step to automatically compare the selectively corrected and supplemented minutiae data extracted from said given pattern with said stored minutiae data.

4,047,155
UNIVERSAL DATA RECORDING SYSTEM

Arthur O. Miller, 10141 Chesterton Drive, Dallas, Tex. 75238

Continuation of Ser. No. 531,549, Dec. 11, 1974, abandoned.
This application Nov. 16, 1976, Ser. No. 742,091
Int. Cl.[2] H04Q 5/00
U.S. Cl. 340—147 R 14 Claims



1. A condition monitoring system for scanning terminal voltage levels on a plurality of terminals each having an identifying address to detect changes in the voltage level at each of the terminals, comprising in combination:

a central controller for repetitively generating group identifying address codes in a prearranged order of the terminals to establish a group scanning order and including means for generating a control pulse,

a plurality of means for decoding the group identifying address codes, each of said means for decoding responsive to one group identifying address code and generating a gate control voltage,

a plurality of scanner gates at least equal in number to the plurality of terminals, said gates connected to the terminals and enabled by a gate control voltage and responsive into a conduction mode by a terminal voltage level above a reference voltage,

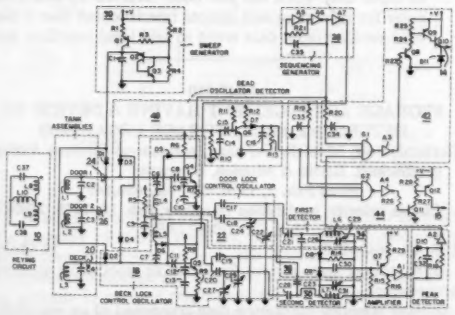
means responsive to the control pulse to apply a gate control voltage to selected scanner gates to enable said gates to respond to a terminal voltage above a reference voltage, and

detector means responsive to the voltage level on the terminals connected to the scanner gates in the conduction mode to generate a terminal status signal for each such terminal.

4,047,156
REACTIVELY DECOUPLED DUAL CHANNEL KEYING CIRCUIT FOR WIDE-BAND FREQUENCY MODULATED KEYABLE CONTROL CIRCUIT

Carl E. Atkins, Montclair, N.J., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Apr. 12, 1976, Ser. No. 675,950
Int. Cl.[2] H04Q 9/10; H01F 5/00; G08B 21/00
U.S. Cl. 340—171 A 5 Claims



1. In a dual channel keyable control circuit of the type having swept rf energy coupled to at least one sensing coil, the invention of a keying circuit to trigger said keyable control circuit into producing a control output signal comprising:

a. a first resonant circuit containing at least a first inductor in parallel with a first capacitor said first resonant circuit being resonant at a first rf frequency;

b. a second resonant circuit containing at least a second inductor in parallel with a second capacitor said second resonant circuit being resonant at a second rf frequency different from said first rf frequency;

c. a common connection between said first and second resonant circuits;

d. a reactance in the common connection between said first and second resonant circuits;

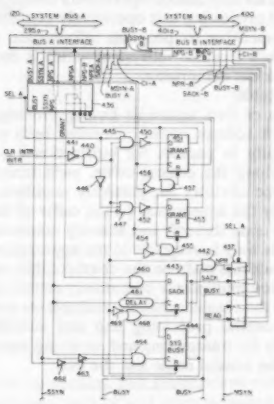
e. when said swept rf energy is at the resonant frequency of said first resonant circuit, said reactance feeding into said first resonant circuit a signal of substantially correct amplitude and phase to cancel the rf energy coupled into said first resonant circuit by the proximity of said second resonant circuit; and

f. when said swept rf energy is at the rf frequency of said second resonant circuit, said reactance feeding into said second resonant circuit a signal of substantially correct amplitude and phase to cancel the rf energy coupled into said second resonant circuit by the proximity of said first resonant circuit.

4,047,157
SECONDARY STORAGE FACILITY FOR DATA PROCESSING

Stephen R. Jenkins, Acton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Feb. 1, 1974, Ser. No. 438,952
Int. Cl.[2] G06F 3/00
U.S. Cl. 364—900 22 Claims



1. A controller for a secondary storage facility in a data processing system, said controller being adapted for connection to first and second system buses connected to addressed storage locations and at least one drive including direct access storage means and said controller comprising:

A. buffer storage means for data,

B. means for transmitting address signals for identifying an addressed storage location connected to a system bus,

C. means for transmitting control signals for effecting a system bus data transfer between said controller and the system buses

D. means for transferring data between a drive and said buffer storage means,

E. register means for assuming at least two states,

F. first routing means connected to said address signal transmitting means, said control signal transmitting means and

said buffer storage means for transferring address signals to and control signals and data to and from the first system bus in response to a first state of said register means, and

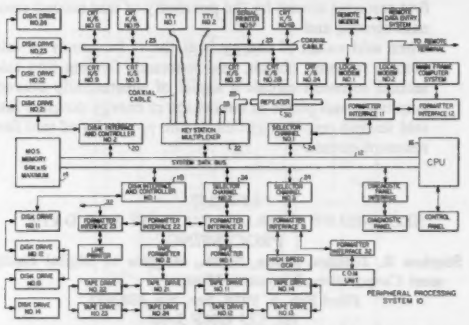
G. second routing means connected to said address signal transmitting means, said control signal transmitting means and said buffer storage means for transferring address signals to and control signals and data to or from the second system bus in response to a second state of said register means.

4,047,158

PERIPHERAL PROCESSING SYSTEM

Alan K. Jennings, Anaheim, Calif., assignor to Pertec Corporation, Los Angeles, Calif.

Filed Dec. 13, 1974, Ser. No. 532,636
Int. Cl.² G06F *3/00*
U.S. Cl. 364—900 **30 Claims**



1. In a peripheral processing system having a bus, a memory storing program information operatively connected to the bus, and a central processing unit operatively connected to the bus which is responsive to program information stored in the memory, a data terminal subsystem which is operatively connected to the bus comprising:

a coaxial cable;

a plurality of data terminals having preassigned mutually exclusive address codes connected both physically and electrically in parallel for bidirectional communication solely along the coaxial cable, each terminal including electronic circuitry for passively monitoring the coaxial cable for the appearance on the calbe of the preassigned address code thereof, and actively communicating along the cable only in response to the appearance of the preassigned address code on the coaxial cable; and

a key station multiplexer operatively connected to both the bus and the coaxial cable, the multiplexer being responsive to the central processing unit and including electronic circuitry for transmitting and receiving encoded messages along the coaxial cable and the bus.

4,047,159

DATA TRANSMISSION SYSTEMS

Michael Robert Boudry, London, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 8, 1975, Ser. No. 594,066
Claims priority, application United Kingdom, July 30, 1974, 33587/74
Int. Cl.² G06F *3/04*
U.S. Cl. 364—900 **11 Claims**

1. An interface system for a computer comprising:

a RELEASE line connected to said computer;

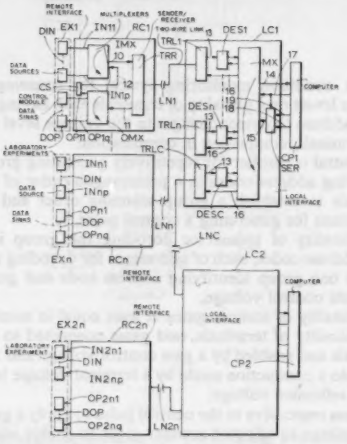
a plurality of data word sources and data word sinks;

a plurality of communications links;

a plurality of remote interface units connected to said data sources and data sinks, each one of said remote interface units connected to a corresponding one of said communications links for transferring data words therebetween via a first I/O sub-channel; each of said remote interface units comprising a serializer and a deserializer for converting said data words between serial and parallel form; an input multiplexer connected to said serializer, and an output multiplexer connected to said deserializer

a local interface unit, connected to said computer and at least one of said communications links for transferring input data words via a plurality of second I/O sub-channels therebetween, and comprising

a plurality of buffers each buffer connected to a corresponding one of said communication links, each buffer comprising a plurality of locations for storing in parallel form a single input data word transferred from one of said data sources and received in bit serial form from one of said corresponding links; said RELEASE line connected to each of said buffers for clearing a first one of said buffers when a RELEASE signal generated by said computer on said RELEASE line is transmitted to said first one buffer,



said RELEASE signal being indicative that said computer has received an input data word from said local interface unit; means for polling each of said buffers in turn, and being responsive to the presence of an input data word in a second one of said buffers for temporarily stopping polling of said buffers at said second one of said buffers, said means for polling being connected to said RELEASE line and responsive to said RELEASE signal from said computer to resume polling of said buffers at the next one of said buffers in turn; and

transmitting means for transmitting an acknowledge data word in bit serial form to a corresponding one of said remote interface units along a corresponding one of said communications links from whose corresponding buffer an input data word has just been received by said computer for informing said remote interface unit that it may send another input data word to said local interface unit.

4,047,160

STORAGE ARRANGEMENT HAVING A DEVICE TO DETERMINE FREE STORAGE LOCATIONS

Gerhard Wolf, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 2, 1976, Ser. No. 654,645
Claims priority, application Germany, Feb. 10, 1975, 2505478
Int. Cl.² G06F *13/00*
U.S. Cl. 364—900 **11 Claims**

1. A storage arrangement for use as an associative memory, comprising:

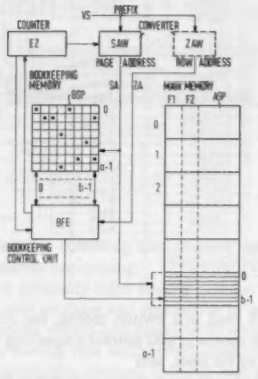
a main memory for storing data composed of an associative component and a non-associative component;

a comparator device connected to said main memory to compare the associative part of data therefrom with a search word;

said main memory comprising a linearly addressed storage bank divided into *a* pages each including *b* rows, each of said rows including a storage position for the data and a portion for storing reference characteristics;

page and row address converters for providing page and row addresses in response to receipt of a prefix;

an extension counter connected to said page address converter to co-determine page address in accordance with its relavant count and whose count is increased by one when an initially addressed storage position is engaged;



a book-keeping memory connected to said page address converters and operated to be read row-by-row, said book-keeping memory comprising *a* rows each including *b* bit positions, where each row corresponds to a page and each bit position corresponds to a row of said main memory, each bit position storing a mark indicating seizure of the corresponding row of said main memory; and

a book-keeping control unit connected to said counter, to said row address converters, to said book-keeping memory and to said main memory, and operable to control the setting and interrogation of the seizure marks and the selection of equivalent storage positions in said main memory.

4,047,161

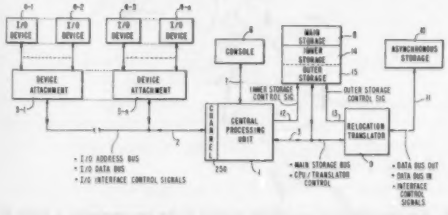
TASK MANAGEMENT APPARATUS

Michael Ian Davis, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1976, Ser. No. 681,953

Int. Cl.² G06F *9/19, 9/20*

U.S. Cl. 364—200 **11 Claims**



1. In a data processing system of the type in which each set of a plurality of sets of registers, one set being provided for each interrupt priority level in the system, interacts with a common main storage and common arithmetic and logic control circuits to execute respective tasks of a program, and in which a task dispatching program means operates in conjunction with priority/interrupt controls to dispatch tasks in a desired sequence to the sets of registers so that each set of registers, the arithmetic and logic unit and the main storage can process a respective task currently assigned to the latter set of registers when its priority is highest,

in combination with said register sets, storage, control circuits, program means and priority/interrupt controls,

apparatus, controlled in accordance with the execution of one machine level task instruction for assisting the dispatching of tasks, comprising

a main storage area for holding a task address and status block (LSB) for each task for which execution is to be initiated or continued,

means for fetching from main storage the LSB of a selected task and for storing the fetched LSB in the register set of a selected level,

means for determining the in-process status of the selected task and the relative priority levels on which said one instruction of a current task is being executed and on which the selected task is intended for execution, and

means responsive to said in-process status and said relative priority levels for initiating the execution of the selected task when the in-process status is "on" and the priority level of the selected task is higher than that of the current task.

4,047,162

INTERFACE CIRCUIT FOR COMMUNICATING BETWEEN TWO DATA HIGHWAYS

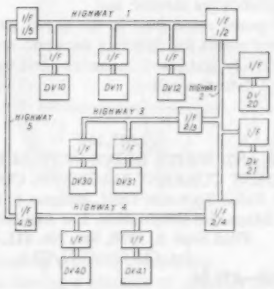
Howard Anthony Dorey, Godalming, and Robert John Cooke, Farnborough, both of England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed Apr. 28, 1975, Ser. No. 572,052

Claims priority, application United Kingdom, May 2, 1974, 19366/74

Int. Cl.² G06F *3/04*

U.S. Cl. 364—200 **11 Claims**



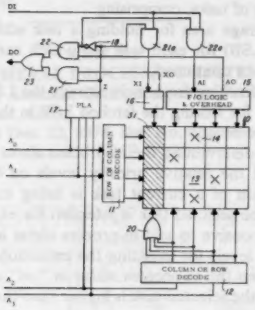
1. An interface comprising two symmetrical ports connectable to data highways, each of said ports including data terminals, handshake terminals, at least one control terminal to which can be applied a special command signal indicative of whether a data byte on said data terminals is information or a command, and status control means responsive to command bytes accompanied by said special command signal received from a data highway at either port to establish different statuses of the interface, including statuses in which the data terminals of the ports are placed in communication for the flow of data therebetween; means responsive to a predetermined command byte on one of said data highways which addresses the interface at one of said ports for causing the interface to enter a particular status; and means responsive to the existence of said particular status and a byte received from said one data highway at said one port for generating a modified byte as a command byte at the other port.

4,047,163

FAULT-TOLERANT CELL ADDRESSABLE ARRAY

William Clay Choate, Dallas, and Dileep P. Bhandarkar, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed July 3, 1975, Ser. No. 592,979
Int. Cl.[2] G11C *11/40, 13/00*
U.S. Cl. 340—173 R 53 Claims



1. A defect-tolerant cell addressable array comprising:
a. an array of functional cells arranged in rows and columns;
b. a plurality of redundant functional cells;
c. cell selection means responsive to cell address code signals for selectively addressing an individual functional cell in a respective row and column and simultaneously addressing a corresponding redundant cell;
d. memory means in which address codes of the row and column addresses of defective functional cells are selectively storable, said memory means being responsive to said cell address code signals for detecting when the cell address code signals correspond to the address codes of defective ones of said functional cells and for generating a signal indicative thereof; and
e. logic means responsive to the signal generated by said memory means for directing data into and/or out of the respectively addressed redundant cell instead of an addressed defective cell.

4,047,164

READ AND WRITE DRIVE SYSTEM FOR A 2½D COINCIDENT CURRENT MAGNETIC CORE MEMORY

Michael F. Boice, Torrance, Calif., assignor to Electronic Memories & Magnetics Corporation, Los Angeles, Calif.

Filed Sept. 8, 1975, Ser. No. 611,227
Int. Cl.[2] G11C *11/02*
U.S. Cl. 340—174 M 3 Claims

1. In a 2½D magnetic core memory for storing n-bit words, a plurality, N, of groups of bit lines, being provided for each word bit, each group having the same number, M, of bit lines, each bit line being threaded through a plurality of cores, each core storing a bit of a different word, for an n-bit word there being provided a total of n.N groups of bit lines, each bit in a word being stored in a correspondingly placed core in a different one of said N groups of bit lines, a switching system for said memory comprising:

a separate write drive switch means for each group of bit lines in all of said n.N groups,

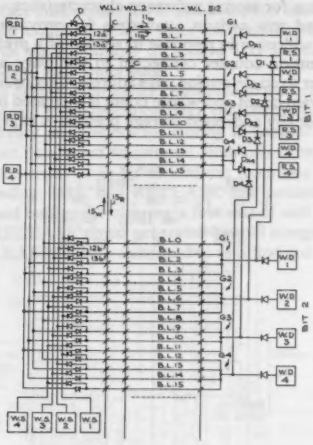
means connecting each one of said write drive switch means to one of the ends of a different one of the groups of bit lines,

a plurality of write sink switch means, the number in said plurality equalling the number, N, of groups of bit lines,

means connecting each one of said write sink switch means to the other ends of different but correspondingly located bit lines in all of said n.N groups of bit lines,

a plurality of read drive switch means, the number in said plurality equalling the number, N, of groups of bit lines,

means connecting each one of said read drive switch means to said other ends of different but correspondingly located bit lines in all of said n.N groups of bit lines,



a plurality of read sink switch means, the number of read sink switch means in said plurality equalling the number N of groups of bit lines, and

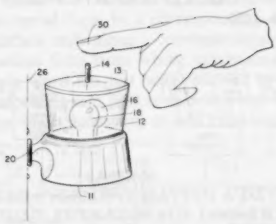
means coupling each read sink switch means to said one ends of a different but correspondingly located group of bit lines in all of said n.N groups of bit lines.

4,047,165

EMERGENCY SIGNAL LIGHT

Betty Andreasson, and Rebecca M. Anderson, both of 50 Russell Hill Road, Ashburnham, Mass. 01430

Filed May 20, 1976, Ser. No. 688,173
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—227 R 6 Claims



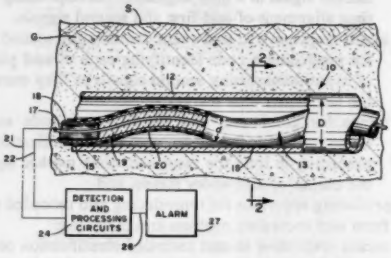
1. An emergency warning signal light comprising a base to which is attached a transluscent housing, an electrical energy source, a first flashing lamp electrically connected to the energy source through a depressable electrical switch, and a second flashing lamp electrically connected to the energy source through a heat-sensing switch; the combination providing a selective signaling and automatic warning system.

4,047,166

ELECTROSTATICALLY CHARGED CABLE TRANSDUCER

G. Kirby Miller, Saratoga, and John F. Lawler, Los Altos, both of Calif., assignors to GTE Sylvania Incorporated, Mountain View, Calif.

Continuation-in-part of Ser. No. 652,375, Jan. 26, 1976, abandoned. This application Aug. 30, 1976, Ser. No. 718,844
Int. Cl.[2] G08B 13/10
U.S. Cl. 340—261 15 Claims



1. Mechanism for detecting disturbances which propagate waves in a medium comprising

an elongated generally rigid hollow member adapted to be buried in said medium and responsive to said waves, and

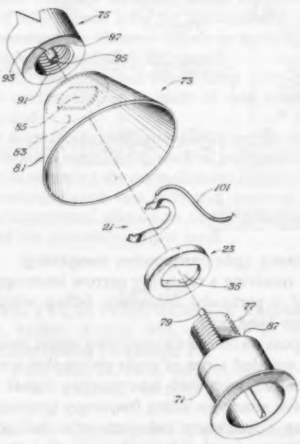
a cable disposed within and engageable with said member, said cable having first and second conductors spaced by an electrostatically charged material and having an outside transverse dimension less than the inside transverse dimension of said member whereby the member and cable are movable relative to each other in response to said waves for generating electrical signals between said conductors.

4,047,167

RELAXATION SWITCH

Bill F. Helena, 6365 Greenway Road, Fort Worth, Tex. 76116

Filed Aug. 12, 1976, Ser. No. 713,698
Int. Cl.[2] G08B 13/14
U.S. Cl. 340—280 4 Claims



1. An electrical switch, comprising:

electrically conducting switch means having a resilient normally bowed portion,

said normally bowed portion being adapted to be flattened by the application of pressure thereto,

a base member,

an electrically conducting means located in a given position relative to said base member,

connection means for securing said switch means to said base member with an engaging portion of said switch means being free to move relative to said electrically conducting means when said normally bowed portion is flattened and when said normally bowed portion is allowed to assume its normally bowed position,

said electrically conducting means being located such that said engaging portion of said switch means is out of engagement with said electrically conducting means when said normally bowed portion is flattened but engages said electrically conducting means when said normally bowed portion is allowed to assume its normally bowed position, and

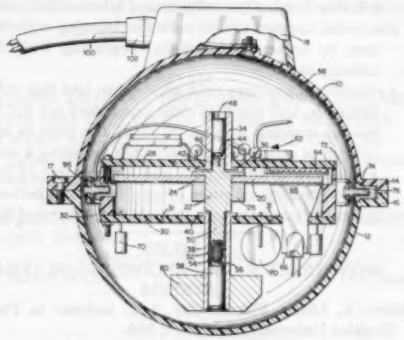
removable holding means adapted to be located in a predetermined position for normally flattening said normally bowed portion of said switch means to cause said engaging portion to be located out of engagement with said electrically conducting means.

4,047,168

DIGITAL COMPASS AND GIMBAL ASSEMBLY FOR TWO CONDUCTOR CONNECTION

John T. Fowler, Winthrop, Mass., assignor to The Laitram Corporation, Harahan, La.

Filed May 22, 1975, Ser. No. 579,973
Int. Cl.[2] G01C 17/26; H03K 13/02
U.S. Cl. 340—310 R 19 Claims



1. A remote reading compass comprising:

a compass disc having a plurality of optically coded tracks providing coded representations of compass headings;

magnetic means affixed to and rotatable with said compass disc about a normally vertical axis;

means for mounting said compass disc for rotation about said normally vertical axis;

photoelectric means for sensing said coded tracks to provide digital signal representations of compass headings;

electronic circuit means including said photoelectric means and having only first and second terminals by which energizing power is applied to said circuit means and by which digital output signals are coupled from said circuit means representative of compass heading;

current source means for providing a limited energizing current; and

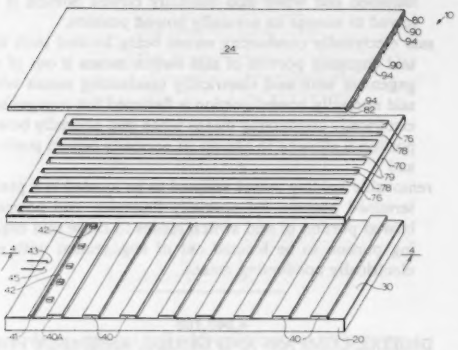
means for coupling said current source means to said first and second terminals of said circuit means;

said electronic circuit means further including means for selectively shunting said first and second terminals to transmit said digital signals.

4,047,169
DISPLAY PANEL HAVING IMPROVED ARRANGEMENT OF RESET CELLS FOR FACILITATING SCANNING OF THE PANEL

George E. Holz, North Plainfield, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 9, 1976, Ser. No. 656,657
Int. Cl.[2] G06F 3/14
U.S. Cl. 340—324 M 6 Claims



1. A display panel comprising

a gas-filled envelope having a base plate and face plate hermetically sealed together, said face plate having a viewing window,

an array of rows and columns of first gas-filled cells for displaying characters in said envelope, said cells including a first column, a last column and intermediate columns,

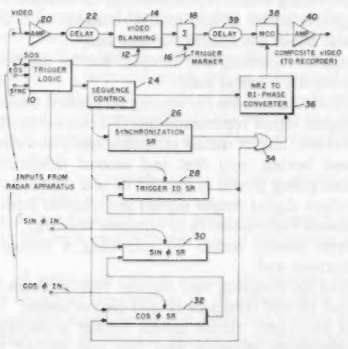
electrodes coupled to said cells for scanning said cells, column by column sequentially, beginning with the first column, and

a plurality of auxiliary cells adjacent to said first column of first cells, said auxiliary cells being used not for veiwing but for insuring turn-on of all of the cells in said first column of cells, said auxiliary cells including a column of auxiliary cells adjacent to said first column of first cells and a plurality of rows of auxiliary cells between said column of auxiliary cells and said first column of first cells.

4,047,170
MONOTRACK RADAR RECORDING/PLAYBACK SYSTEM

Robert E. Miller, Ellicott City, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Nov. 10, 1975, Ser. No. 630,506
Int. Cl.[2] G01S 9/02, 7/30
U.S. Cl. 343—5 PC 16 Claims



1. A system for recording and reproducing an informational first signal and a plurality of related event demarcating second signals comprising, in combination,

a recording medium,

recorder apparatus for recording signals on said recording medium and including,

means responsive to the occurrence of an event demarcating second signal for generating a time marker signal demarcating said occurrence,

adder means connected to receive and add together as an output said informational first signal and said time marker signal in a time alignment corresponding to the time alignment of said first and second signals,

means responsive to said event demarcating second signal for producing a code identifying each of said plurality of event demarcating second signals as they occur and the associated time marker signal, and

means for combining said identification code and the output of said adder means, with said identification code preceding in time the associated time marker signal at the output of said adder means, and

reproducing apparatus for reproducing said recorded signals from said recording medium and including,

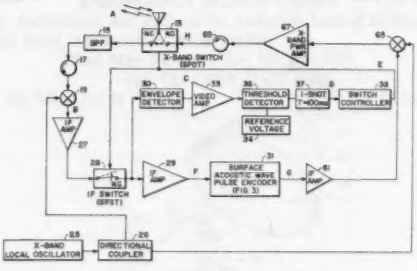
means responsive to said recorded identification code for registering prior to the occurrence of the associated time marker signal in said recorded signals the identity of the event demarcating signal represented by said recorded associated time marker signal, and

means responsive to said identification code registering means and said recorded associated time marker signal for reproducing each event demarcating signal in said correct time alignment with said informational first signal.

4,047,171
TRANSPONDER

Brian Blair Fugit, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 15, 1975, Ser. No. 613,374
Int. Cl.[2] G01S 9/56; H03H 7/30
U.S. Cl. 343—6.8 R 10 Claims



1. A frequency agile transponder, comprising:

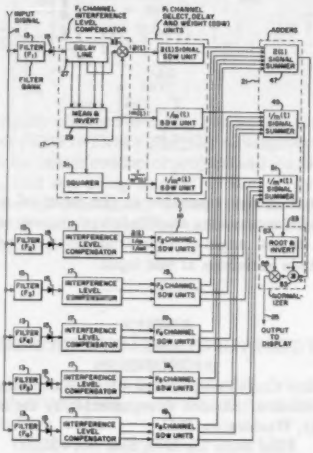
means for receiving a relatively narrow interrogating signal pulse of a particular frequency falling within a given frequency band, and

means responsive to said interrogating signal pulse for transmitting a coded series of reply pulses that are frequency synchronized with said interrogating signal pulse, said responsive means including frequency memory means for receiving a frequency coherent pulse indicative of the interrogating signal pulse and converting the frequency coherent pulse to a coded series of frequency coherent pulses, said frequency memory means being phase coded to prevent envelope cancellation in the series of pulses.

4,047,172
SIGNAL PROCESSOR FOR PULSE-ECHO SYSTEM PROVIDING INTERFERENCE LEVEL COMPENSATION AND FEED-FORWARD NORMALIZATION

Lowell W. Bauer, Liverpool, and John P. Costas, Fayetteville, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed May 30, 1972, Ser. No. 257,879
Int. Cl.² G01S *7/28, 9/44, 9/66*
U.S. Cl. 343—17.1 R **5 Claims**



5. For use in an object detection system including transmitter means for illuminating the object with wave energy transmitted as a plurality of subpulses of different frequencies ordered in particular sequence and including receiver means for detecting echo returns of transmitted energy as reflected by the object, received signal processor means comprising:

a. a plurality of signal processor channels of number at least equal to the number of different frequencies of the transmitted subpulses;

b. means responsive to frequencies of said received signal subpulses for routing each selectively into said processor channels;

c. interference level compensation means in each of said processor channels including means for deriving an estimate of interference level for the respective channel and compensating the channel signals in accordance with an inverse function of such estimate;

d. means for summing said interference level compensated signals corresponding to each of said transmitted subpulses; and

e. output normalizing means including means for deriving a normalization signal from each of said interference level estimates, summing the normalization signals thus derived, and combining such sum with said summed interference level compensated signals so as to minimize change in mean of the processor output level.

4,047,173
FM PULSE COMPRESSION RADAR

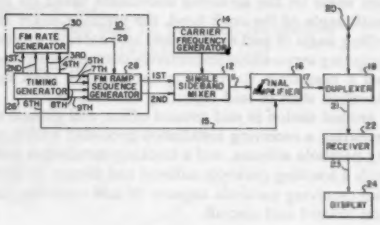
Coleman J. Miller, Arnold, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 24, 1976, Ser. No. 699,271
Int. Cl.² G01S *17/28*
U.S. Cl. 343—17.2 PC **12 Claims**

1. A method for operating an FM pulse compression radar for detecting moving targets in a single range cell comprising the steps of:

generating a predetermined sequence of spaced apart FM signals, each successive signal in said sequence having an FM rate determined by a function of the amount of time since said sequence started;

transmitting said sequence of FM signals; and



receiving reflected FM signals whereby signals indicative of a target may be integrated in a receiver at constant range.

4,047,174
METHOD OF REDUCING THE RADAR CROSS-SECTION OF A DIELECTRIC BODY

Robert J. Wohlers, Orchard Park, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 7, 1968, Ser. No. 736,935
Int. Cl.² H01Q *15/18*
U.S. Cl. 343—18 B **1 Claim**

1. A method of reducing the radar cross-section of a dielectric covered nosecone, including the steps of:

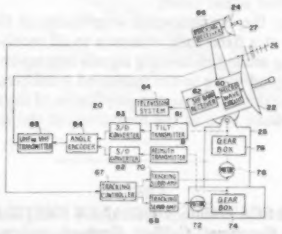
coating said nosecone with an electrically resistive material, and

applying an electrically conductive material to said resistive coating in a predetermined pattern.

4,047,175
TELEVISION ANTENNA DIRECTING AND TRACKING SYSTEM FOR TELEVISION PROGRAM NETWORK BETWEEN AIR-BORNE AND GROUND OFFICES

Hideya Taira, and Kuniaki Shimizu, both of Tokyo, Japan, assignors to Tokyo Keiki Company Limited, Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,529
Claims priority, application Japan, Mar. 5, 1975, 50-26089; July 24, 1975, 50-89641
Int. Cl.² G01S *3/04*
U.S. Cl. 343—100 CS **11 Claims**



5. An automatic television antenna directing and trackin system comprising

1. a repeating antenna mounted on an aircraft for repeating television video singals to a ground office,

2. an air-borne station including an antenna driving unit for automatically directing said repeating antenna toward said ground station, direction angle self setting means and coordinate transforming means, said direction angle self setting means including means responsive to a flight information for applying to said coordinate transforming means an azimuth angle and an elevation angle required to

direct said repeating antenna toward said ground office, said coordinate transforming means transforming the azimuth angle and the elevation angle on the longitude-latitude coordinate into the azimuth angle and the elevation angle on the air-borne coordinate based on the azimuth angle of the craft head, the pitching angle and the rolling angle of said aircraft, and said antenna driving unit including servo-loops respectively containg a servo-motor and a gear train for rotating the azimuth shaft and the elevation shaft of said repeating antenna, and

3. a ground station in said ground office, and ground station including a receiving installation provided with a receiving parabola antenna, and a tracking installation provided with a tracking parabola antenna and means for directing said receiving parabola antenna of said receiving installation toward said aircraft.

4,047,176

METHOD FOR THE COMPARATIVE VECTOR MEASUREMENT OF SIGNAL PULSES ARRIVING NEARLY SIMULTANEOUSLY AT SEVERAL RADIO RECEIVING STATIONS

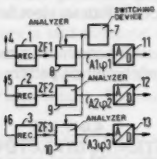
Klaus V. Pieverling, Wolfratshausen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 6, 1975, Ser. No. 629,282

Claims priority, application Germany, Nov. 13, 1974, 2453904

Int. Cl.² G01S *1/44*

U.S. Cl. 343—106 R **10 Claims**



1. A method of comparative vector measurement of keyed radio signal pulses, in particular DME pulses, arriving nearly simultaneously at several receivers and which can have great level differences, comprising the steps of:

feeding the received pulses to a variable signal transfer function circuit and automatically reducing the signal level in response to the rising of the leading edge of a respective signal pulse;

measuring the instantaneous amplitudes of the transferred signals at a fixed time common to all receivers;

producing second measuring signals corresponding to and in phase quadrature to the measured transferred signals; and

measuring the instantaneous amplitudes of the second signals at the same time as the measuring of the transferred signals.

4,047,177

DOPPLER SCANNING GUIDANCE SYSTEM RECEIVER

Francis G. Overbury, Cuffley, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 5, 1975, Ser. No. 637,941

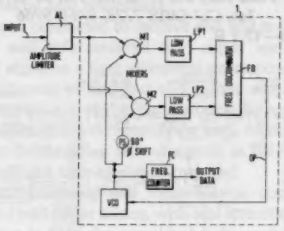
Claims priority, application United Kingdom, Dec. 23, 1974, 55381/74

Int. Cl.² G01S *5/02*

U.S. Cl. 343—113 DE **4 Claims**

1. In a Doppler scanning guidance system receiver responsive to Doppler scanning ground Beacon transmissions including a main bearing signal and an offset reference signal, the combination comprising:

first means comprising a phase-lock loop, said loop including mixing means responsive to said main and reference received signals in a predetermined frequency band, a frequency discriminator responsive to said mixing means output, and a variable frequency oscillator responsive to a frequency controlling signal derived by said discriminator, said oscillator providing a local oscillator signal to said mixing means;



and second means operative at the input of said mixing means for suppressing amplitude variations to suppress the effect of near angle multipath interferences which cause amplitude variations at said input.

4,047,178

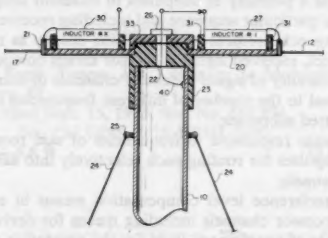
LOW LOSS TOP TERMINATION FOR SHORT MONOPOLES

Watson Peter Czerwinski, Forked River, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 22, 1976, Ser. No. 725,217

Int. Cl.² H01Q *9/36*

U.S. Cl. 343—750 **1 Claim**



1. A capacitor and inductor compensated monopole antenna comprising:

A monopole antenna having an upper and lower end;

capacitor means comprising a plurality of metallic whips insulated from said monopole antenna and located at the upper end thereof;

a plurality of inductors, physically positioned above said capacitor means; and,

coupling means for electrically coupling said capacitor means to said monopole antenna selectively through any of said plurality of inductors.

4,047,179

IFF ANTENNA ARRANGEMENT

Alfred J. Appelbaum, Newton Center, Mass.; Michael J. Collins, Merrimack, N.H., and Jerome D. Hanfling, Framingham, Mass., assignors to Raytheon Company, Lexington, Mass.

Filed May 3, 1976, Ser. No. 682,428

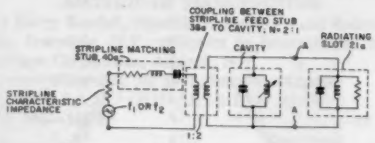
Int. Cl.² H01Q *3/26*

U.S. Cl. 343—768 **7 Claims**

1. An antenna arrangement adapted to transmit radio frequency energy at a first frequency, f_1, and to receive radio

frequency at a second frequency, f_2, such arrangement comprising:

a. a stripline having a center conductor disposed between opposing ground planes and a radiating slot formed in one of such ground planes, the resonant frequency of such slot being equal to the average of the frequencies f_1 and f_2; and



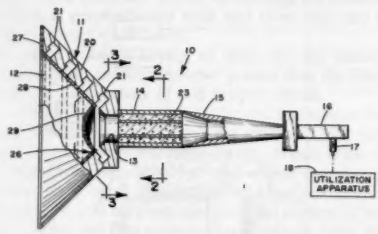
b. electrically conductive means connecting the opposing ground planes to form a generally rectangular cavity into which the center conductor projects and the radiating slot opens, said slot being coupled to said cavity at an end opposite the electrically conductive the resonant frequency of such cavity being equal to the average of the frequencies f_1 and f_2.

4,047,180

BROADBAND CORRUGATED HORN ANTENNA WITH RADOME

Samuel Chung-Shu Kuo, Saratoga, and William D. Rosser, Los Altos, both of Calif., assignors to GTE Sylvania Incorporated, Mountain View, Calif.

Filed June 1, 1976, Ser. No. 691,321
Int. Cl.² H01Q *13/06*
U.S. Cl. 343—784 **4 Claims**



1. An antenna system operable over a wide frequency range comprising

a conical corrugated horn antenna having an inner surface formed broadband slots and having an aperture and a feed port,

a radome on said antenna, said radome having a frustoconical portion adjacent to the inner surface of said horn with an outer end coincident with said aperture and an inner end proximate to said feed port, said radome also having a spherically-shaped transverse wall across said inner end, the convex side of said wall facing the outer end of said radome,

waveguide means connected to said port, said waveguide means comprising

a ridged rectangular waveguide,

a tapered transition waveguide connected to said ridged waveguide, and

a cylindrical waveguide connected between said transition waveguide and said feed port of the horn, and

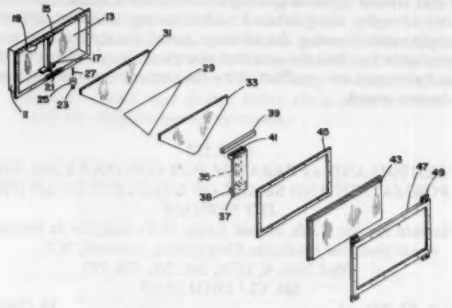
hybrid mode suppressor means disposed within said cylindrical waveguide whereby to suppress higher order hybrid wave modes in said horn and correspondingly increase its operating bandwidth.

4,047,181

OMNIDIRECTIONAL ANTENNA

Gary R. Hoople, San Jose, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 17, 1976, Ser. No. 686,868
Int. Cl.² H01Q *1/28*
U.S. Cl. 343—789 **10 Claims**



1. In an antenna of the type having an input channel to receive electromagnetic energy transmitted by a coaxial cable and a cavity having a solid rear wall and having an aperture at its front to allow the radiation of said electromagnetic energy into free space wherein the improvement comprises:

a. a metallic probe positioned interior to said cavity;

b. said probe for electrical connection with said coaxial cable;

c. a first and a second T-guide each made of conductive material; and

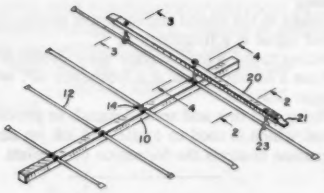
d. said first T-guide located between said probe and said aperture and said second T-guide located between said probe and said rear wall.

4,047,182

DAMPENING GUARD FOR TV ANTENNAS

Jack Faren, 12 Manito Ave., Oakland, N.J. 07436

Filed Sept. 20, 1976, Ser. No. 724,842
Int. Cl.² H01Q *13/00*
U.S. Cl. 343—904 **14 Claims**



1. An element guard dampening apparatus for attachment to the extending metal transverse signal collecting elements of the antenna such as is used for TV and FM and collecting such signals as VHF, UHF and FM, said dampener engaging and reducing to an extent the destructive effect caused by vibrations of the metal elements carried by a spine, said vibrations developing as the result of high winds, said element guard apparatus including: (a) a transverse member which is adapted to be placed adjacent oppositely disposed metal signal collecting elements of an antenna and to extend at least to the midlength of each element; (b) a pair of hanger element retainers, each retainer having one end secured to the transverse member and an opposite hook-like end sized and adapted to slide on and retain the extending metal collecting elements of the antenna,

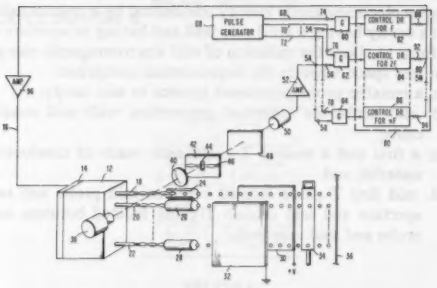
said hangers secured to the transverse member so as to permit the transverse member to extend from said one collecting element to the oppositely disposed collecting element mounted to the spine portion of the antenna, and (c) a screw mounted and turnable in a threaded aperture of the transverse member, the element guard in a mounted condition having an end of the screw in engagement with the spine of the antenna and when the screw is turned inwardly the transverse member and the attached hanger retainers are moved vertically to bring the metal tubular signal collecting elements into a tensioned condition whereby wind induced vibrations are inhibited, and the components forming the element guard are sufficiently nonconductive so that the received electrical signals of and by the said elements are unaffected by the presence of the mounted element guard.

4,047,183

METHOD AND APPARATUS FOR CONTROLLING THE FORMATION AND SHAPE OF DROPLETS IN AN INK JET STREAM

Howard Hyman Taub, Mount Kisco, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 4, 1976, Ser. No. 738,777
Int. Cl.² G01D *15/13*
U.S. Cl. 346—1 **10 Claims**



1. In an ink jet printing system, a method of controlling the formation of droplets in an ink jet stream, said method comprising the steps of:

illuminating said ink jet stream in a region where the stream has yet to break up to form droplets;

sensing the surface wave profile of the illuminated ink jet stream;

responding to the sensed surface wave profile for providing a first signal at a frequency F;

responding to the sensed surface wave profile for providing at least a second signal at a freuqency nF, where n is an integer ≥ 2; and

combining said first and second signals to provide a control signal which is used to excite said ink jet stream, which excitation controls the formation of droplets.

4,047,184

CHARGE ELECTRODE ARRAY AND COMBINATION FOR INK JET PRINTING AND METHOD OF MANUFACTURE

Ernest Bassous, Riverdale, and Lawrence Kuhn, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

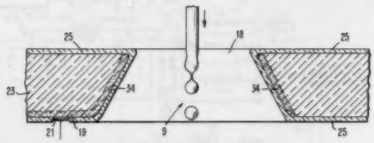
Filed Jan. 28, 1976, Ser. No. 653,168
Int. Cl.² G01D *15/18*
U.S. Cl. 346—75 **30 Claims**

1. A charge electrode array in an ink jet recording apparatus for controlling the charge of droplets formed from a plurality of liquid streams comprising:

a monocrystalline silicon substrate of (110) orientation having a plurality of apertures extending therethrough, with each of the apertures having one of the liquid streams pass therethrough with droplets being produced from the stream while in the aperture;

a first diffused region of the opposite type of conductivity to the type of conductivity of said substrate in the walls of each said aperture;

a second diffused region of the same conductivity as the first diffused region extending from and connected to said first



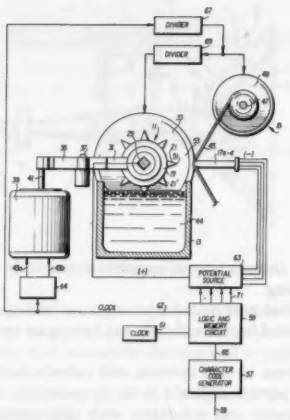
diffused region to provide an electrical contact surface for receiving a voltage to control the charge electrode during the printing operation; a third diffused region of the same conductivity type as the substrate and having an electrical contact surface for receiving a bias in said substrate and located on the side with said second diffused region; and an insulating layer over the entire array, other than the external contact surfaces.

4,047,185

MULTI-JET INK PRINTER USING STAR-WHEEL JET FORMERS

Edwin R. Phillips, Rosemont, and Raymond J. Stankiewicz, Philadelphia, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,032
Int. Cl.² G01G *15/16*
U.S. Cl. 346—140 R **11 Claims**



1. Apparatus for producing imprints of selective shapes on a recording carrier comprising:

a recording-carrier support means for supporting a recording carrier;

a printing-head means comprising at least one protruding prong having a pointed tip adapted to be directed toward said recording carrier, said at least one protruding prong having a pyramidal shape;

an ink reservoir positioned adjacent to said printing-head means for holding ink;

a resupply means for dipping the pointed tip of said at least one protruding prong into ink held by said ink reservoir and thereafter directing said pointed tip toward said recording carrier; and

an electrostatic-field means for selectively establishing an electrostatic field between said printing head and said recording carrier during printing modes of operation.

4,047,186

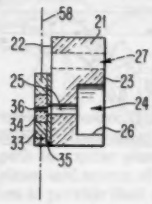
PRE-AIMED NOZZLE FOR INK JET RECORDER AND METHOD OF MANUFACTURE

Arthur Harry Kendall, Franklin Lakes, N.J., and Robert Lewis Rohr, Scarsdale, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,280

Int. Cl.[2] G01D *15/18*; B23P *15/00*

U.S. Cl. 346—140 R **14 Claims**



1. A nozzle apparatus comprising:

a support block having an ink passageway therein connectable to a source of liquid ink under pressure,

said passageway terminating at one end in an opening in a first flat surface of said support block, and

an orifice wafer mounted on said first flat surface of said support block comprising

a wafer body having front and rear surfaces,

an annular orifice element circumferentially fixed held by said wafer body and having an opening the central axis of which is perpendicular with said front and rear flat surfaces of said wafer body,

said orifice element having an inner annular diameter less and an outer annular diameter greater than the diameter of said ink passageway of said support block,

said orifice element having annular end surfaces on front and rear surfaces thereof which are coplanar with said front and rear flat surfaces, respectively, of said wafer body,

said coplanar rear surfaces of said orifice element and said wafer body being attached to said support block with a fluid tight seal between said first flat surface of said support block and said coplanar rear surfaces, with the opening in said orifice element aligned with said opening in said support block.

4,047,187

SYSTEM FOR EXPOSURE MEASUREMENT AND/OR FOCUS DETECTION BY MEANS OF IMAGE SENSER

Yukio Mashimo, Tokyo; Nobuaki Sakurada, Kanagawa; Tadashi Ito, Kanagawa; Fumio Ito, Kanagawa, and Nobuhiko Shinoda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,462

Claims priority, application Japan, Apr. 1, 1974, 49-36790; Apr. 1, 1974, 49-36791; Apr. 1, 1974, 49-36792

Int. Cl.[2] G03B *7/08*

U.S. Cl. 354—23 D **38 Claims**

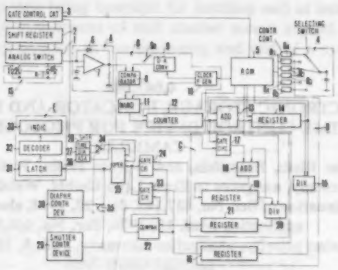
26. A system for exposure measurement and focus adjustment of an image forming optical system settable along an optical axis to form an image of an object at a predetermined position, comprising

photoelectric converting means for converting a light beam into electrical signals, said converting means being arranged at the predetermined position, and including a number of photoelectric converting elements producing electric outputs corresponding to the light beam,

time series producing means coupled to said converting elements for producing a time series of the outputs of the photoelectric converting elements by successively transmitting the outputs of the photoelectric converting elements,

digital converting means for successively converting the time series output of the photoelectric converting elements produced by the time series means into digital values, said converting means being electrically connected with the photoelectric converting means,

a first processing device for processing the outputs of the photographic converting elements converted into digital values in accordance with a first predetermined estimation function so as to detect the focusing condition of the optical system, said device being electrically connected with the digital converting means,



a second processing device for processing the outputs of the photoelectric converting elements converted into digital values by means of the digital converting means on the basis of a second predetermined estimation function, so as to determine an exposure value, said second processing device being electrically connected with the digital converting means, and

adjusting means for adjusting the image forming optical system in accordance with the output of the first processing device, so that the image of the object may be formed at the predetermined position, said means being functionally engaged with the image forming optical system and electrically connected with the first processing device.

4,047,188

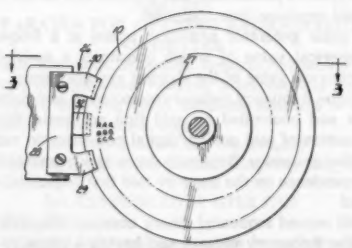
STABILIZER FOR PHOTOCOMPOSITION MATRIX

Felix R. Masiello, Parsippany, N.J., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 28, 1976, Ser. No. 700,409

Int. Cl.[2] G03B *21/134*

U.S. Cl. 354—15 **3 Claims**



1. In a photocomposition machine having a rotating flexible matrix, an optical system, and means for illuminating selected areas of the matrix as the area passes through a position to project into the optical system, the provision of an improved edge guide for the matrix, comprising:

at least two guide surfaces offset with respect to a plane, said offset being substantially equal to the thickness of said matrix;

said guides being spaced relative to one another out of direct facing relationship; and

means for positioning said edge guide with the matrix edge confined within the space defined by said guide surfaces.

4,047,189

ELECTRONIC STORAGE, INDICATOR AND EXPOSURE TIME CONTROL DEVICE FOR PHOTOGRAPHIC CAMERAS

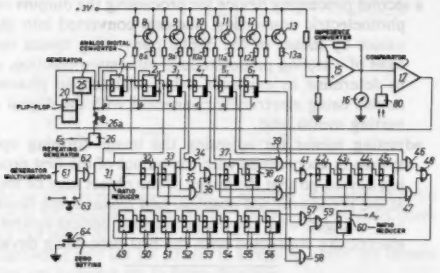
Walter Bletz, Braunfels, and Werner Holle, Wetzlar, both of Germany, assignors to Ernst Leitz GmbH, Wetzlar, Germany

Continuation of Ser. No. 437,142, Jan. 28, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,944

Claims priority, application Germany, Feb. 5, 1973, 2305523

Int. Cl.² G03B 7/08

U.S. Cl. 354—23 D **12 Claims**



1. In an electronic device for storing and indicating illumination parameters and for controlling the exposure time for photographic cameras having means for measuring the exposure time and means for generating said time, the improvement comprising said means for measuring exposure time including an analog/digital first binary counters and having a plurality of stages which correspond to different exposure times depending on the exposure parameters, and wherein said means for generating said exposure time comprise:

a. a pulse generator admitting pulses at a frequency the numerical value of which consitutes a multiple of the reciprocal value of the shortest exposure time;

b. a pulse frequency reducer connected to said pulse generator and controlled by said first sequential first binary counters of said analog/digital converter to reduce said pulse generator frequency by a predetermined ratio in dependence on the stage ov said first sequential counters; and

c. said second sequential binary counters connected to said pulse frequency reducer and having a plurality of AND and OR gates for subdividing into counting chains controlled by said first binary counters, said counting chains switchingly connected to said pulse frequency reducer by said AND and OR gates the reduction of the pulse frequency achieved thereby corresponding to the frequency of said sequential first binary counters.

4,047,190

HYBRID EXPOSURE CONTROL SYSTEM EMPLOYING DUAL MAXIMUM BLADE DISPLACEMENT

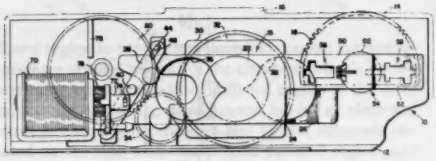
Bruce K. Johnson, Andover, and George D. Whiteside, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 10, 1975, Ser. No. 621,397

The portion of the term of this patent subsequent to July 22, 1992, has been disclaimed.

Int. Cl.² G03B 7/14

U.S. Cl. 354—27 **7 Claims**



4. A photographic exposure control system for a camera, said camera having means for mounting photographic film material at a given focal plane so as to receive image-carrying rays transmitted from the photographic scene along a given optical path, and means for selecting either ambient or artificial illumination operation, said system comprising:

means for sensing the brightness of the scene to be photographed;

a blade mechanism operative for unblocking and blocking at least said given optical path and for defining a primary aperture value in operative relation to said given optical path and a secondary aperture value in operative relation to said brightness sensing means, means for mounting said blade mechanism for displacement in a given direction between a first terminal arrangement wherein said blade mechanism is in blocking relation to at least said given optical path and a second terminal arrangement wherein said blade mechanism is in unblocking relation to both said given optical path and said sensing means, said blade mechanism defining primary and secondary aperture values progressively enlarging from a minimum to a maximum as said blade mechanism is displaced from said first terminal arrangement to a given blade arrangement just short of said second terminal arrangement and a reduced secondary aperture value as said blade mechanism is displaced from said given arrangement to said second terminal arrangement, said reduced secondary aperture value providing a reduction in brightness sensed by said sensing means so as to accommodate low light level brightness conditions of the photographic scene;

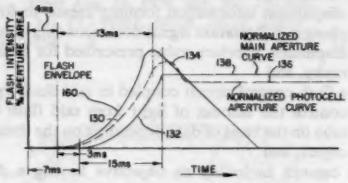
actuatable means operative in both ambient or artificial illumination operation for displacing said blade mechanism from its said first terminal arrangement toward its said second terminal arrangement to unblock said given optical path and initiate an exposure interval during which scene light is directed to the focal plane and, responsive to said scene brightness sensing means, for subsequently displacing said blade mechanism into a blocking arrangement to terminate the exposure interval; and

means responsive to selection of said artificial illumination operation for precluding displacement of said blade member beyond said given blade arrangement.

4,047,191
EXPOSURE CONTROL SYSTEM HAVING DYNAMIC APERTURE FLASH ARRANGEMENT

Richard J. Coppa, Westwood, and Nathan Gold, Framingham, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 22, 1975, Ser. No. 642,986
Int. Cl.² G03B 7/14
U.S. Cl. 354—27 12 Claims



7. A photographic exposure control system for use with a source of flash illumination for transmitting light from a scene along a given optical path to expose photographic material located at a given film plane, said source of illumination being configured upon actuation to provide flash illumination whose intensity increases at a given rate smoothly from zero to a given peak intensity in approximately 13 milliseconds, said system comprising:

a blade mechanism mounted for displacement between a first terminal position wherein said blade mechanism is in blocking relation to said given optical path and a second terminal position wherein said blade mechanism is in unblocking relation to said given optical path, said blade mechanism defining primary aperture values progressively increasing from a minimum to a maximum value in operative relation to said given optical path during displacement from said first to said second position;

drive means actuatable for displacing said blade mechanism between its said first and second positions at a given rate of displacement providing a predetermined rate of increase of aperture value approximating said given rate of increase of illumination;

means for sensing the brightness of the scene to be photographed and for providing an exposure value in accordance therewith;

control means for actuating said drive means to displace said blade mechanism from its said first position toward its said second position to define said increasing aperture values and initiate an exposure interval during which scene light is passed along said given optical path, for actuating said source to initiate illumination therefrom approximately 3 milliseconds prior to said blade mechanism defining said minimum aperture value, and in response to said brightness sensing means for displacing said blade mechanism into blocking relationship with said given optical path to terminate said exposure interval.

4,047,192
PHOTOGRAPHIC APPARATUS WITH SEQUENCING SYSTEM

Bruce K. Johnson, Andover; David E. Van Allen, Malden, and George D. Whiteside, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1975, Ser. No. 554,777
Int. Cl.² G03B 17/50
U.S. Cl. 354—83 52 Claims

1. Photographic apparatus for use in a cycle of operation which includes the exposure of a film unit, said apparatus comprising:

a housing;

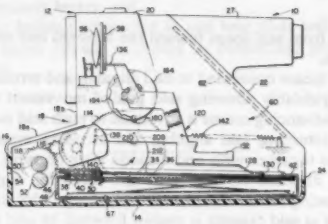
means within said housing for locating a film unit in position for exposure;

exposure means for exposing a film unit located at said exposure position, said exposure means including shutter means having at least one component thereof which is movable between positions blocking and unblocking the transmission of image-bearing light through said shutter means for exposing a film unit, said at least one movable component being configured to be located in said light-blocking position at the beginning and end of a cycle of operation of said apparatus;

biasing means providing a force on said shutter means for urging said at least one movable component of said shutter means from said light-blocking position to said unblocking position;

means being selectively operable to move said at least one movable component of said shutter means from said unblocking position to said blocking position against the urging force of biasing means;

latching means being operable for latching said at least one movable component of said shutter means at said light-blocking position at the beginning and end of a cycle of



operation and for unlatching said at least one movable component of said shutter means for movement between said blocking and unblocking positions during the exposure portion of a cycle of operation;

sequencing means, mounted in said housing for rotation through a single 360° revolution during the course of a cycle of operation of said apparatus, for controlling the sequence of at least some of the events comprising the cycle of operation; and

means responsive to rotating said sequencing means through a first angular segment of said single revolution for causing said latching means to unlatch said at least one movable component of said shutter means located at said light-blocking position prior to exposure of a film unit and responsive to rotating said sequencing means through a second angular segment of said single revolution for causing said latching means to relatch said at least one movable component of said shutter means at said light-blocking position subsequent to exposure of the film unit.

4,047,193
APPARATUS FOR OPENING RADIOGRAPHIC CASSETTES

Emile Frans Stievenart, Hoboken; Hendrik Sylvester Plessers, Boechout; Georges Jozef Neujens, Merksem, and Leo Pa ul Van Bouwel, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed July 3, 1975, Ser. No. 592,879
Claims priority, application United Kingdom, July 5, 1974, 29998/74
Int. Cl.² G03B 17/24; G11B 1/02
U.S. Cl. 354—105 8 Claims

1. An unlocking and opening apparatus for radiographic film cassettes of the type having a bottom, a cover and a locking-unlocking mechanism actuated by exteriorly situated levers, which apparatus comprises

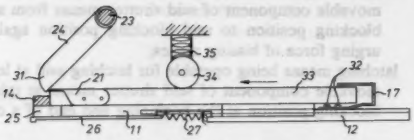
a platform (11) for supporting a cassette for sliding movement along the surface thereof in a lengthwise direction,

cassette advancing means (12) mounted on said platform (11)

for back and forth relative movement in said lengthwise direction, said advancing means including fingers (17, 18) for engaging the rear end of a cassette resting on said platform and pushing said cassette along the platform as said advancing means is advanced,

spaced apart cassette aligning and arresting means (13, 14) projecting above the platform surface at a locus intermediate its ends for engaging the cassette on said platform along its front edge and being movable relative to said platform,

guide means (15, 16, 25) for guiding said aligning and arresting means in a direction parallel to said lengthwise direction from said locus toward the forward end of said platform,



spring means connected to said aligning and arresting means for yieldably allowing said guided movement thereof as the advancing means is advanced to push said cassette and for returning said aligning and arresting means to said locus together with said cassette after opening, and

means disposed forwardly of said locus for engaging the actuating levers of said cassette locking-unlocking mechanism as said cassette is pushed forward by said advancing means to unlock and open said cassette for removal of the film therefrom.

4,047,194

CAMERA SYSTEM WITH MEANS FOR AUTOMATICALLY SWITCHING TO FLASH OPERATION

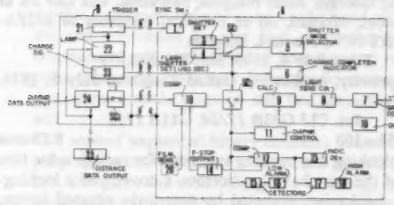
Zenzo Nakamura, Urawa; Takashi Uchiyama, Yokohama; Masanori Uchidoi; Tetsuya Taguchi, both of Kawasaki; Hiroshi Aizawa, Machida, and Tokuichi Tsunekawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1975, Ser. No. 575,002

Claims priority, application Japan, May 8, 1974, 49-50916; May 20, 1974, 49-56275; May 20, 1974, 49-56276; May 20, 1974, 49-56277; May 20, 1974, 49-56278; May 20, 1974, 49-56279; May 20, 1974, 49-56280; July 12, 1974, 49-80009; July 17, 1974, 49-83060; July 18, 1974, 49-82462; July 27, 1974, 49-86371; Sept. 26, 1976, 49-111288

Int. Cl.² G03B *15/05*

U.S. Cl. 354—149 **27 Claims**



1. A flash camera system, comprising:

A. A flash device, having:

a. a flash discharge tube,

b. energy accumulation means connected to said discharge tube for accumulating energy to energize the flash discharge tube,

c. accumulation completion signal forming means connected to said energy accumulation means for forming an energy accumulation completion signal when the energy accumulated at said energy accumulation means reaches a prescribed level,

d. diaphragm information forming means to form a diaphragm information signal corresponding to a constant diaphragm aperture value prescribed for flash photography, and

e. a flash control circuit coupled to said discharge tube to control the amount of light from said flash discharge tube on the basis of data depending on the distance to an object, and

B. a camera, including an objective having a diaphragm defining an exposure opening, and automatic means coupled to the diaphragm for setting the diaphragm aperture to the prescribed aperture value in response to the energy accumulation completion signal at a time of flash photography, said automatic means including;

a. exposure opening control means coupled to said diaphragm to control the exposure opening,

b. an exposure opening control circuit coupled to said exposure opening control means, said circuit having a flash control mode which controls the exposure opening control means based on said prescribed diaphragm aperture value information signal, and

c. a designating circuit connected to said exposure opening control circuit and responding to said energy accumulation completion signal by forming a mode designation signal for setting said exposure opening control circuit to the flash control mode so that the exposure opening control circuit is automatically set to the flash control mode.

4,047,195

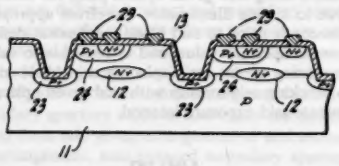
SEMICONDUCTOR STRUCTURE

David F. Allison, Los Altos, Calif., assignor to Scientific Micro Systems, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 414,764, Nov. 12, 1973, abandoned, and a continuation-in-part of Ser. No. 169,294, Aug. 5, 1971. This application Sept. 22, 1975, Ser. No. 615,465

Int. Cl.² H01L *29/06, 27/04, 27/12, 27/02*

U.S. Cl. 357—55 **7 Claims**



1. In a semiconductor structure, a body of crystalline semiconductor material and having an upper surface lying in the 21 100> crystalline plane, isolation moats extending downwardly through said surface and being defined by side walls lying in a crystalline plane different from the <100> crystalline plane and having a bottom wall lying generally in the <100> crystalline plane to provide at said surface isolated islands, bipolar devices formed in the isolated islands, a layer of insulating material insufficient to fill the moats covering said side walls and said bottom walls of said moats regions of higher impurity concentration than that of the semiconductor body extending downwardly from the moats and into the semiconductor body, and a PN junction formed in the body of semiconductor material extending between the moats and below the bipolar de-

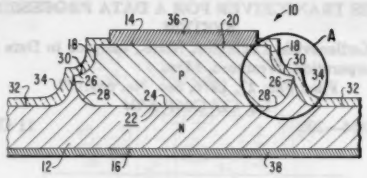
vices, said regions extending through the PN junction and making contact with the side walls of the moats.

4,047,196

HIGH VOLTAGE SEMICONDUCTOR DEVICE HAVING A NOVEL EDGE CONTOUR

Joseph Paul White, Somerville, and Peter Joseph Kannam, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,335
Int. Cl.² H01L *29/06, 29/34, 23/30*
U.S. Cl. 357—55 **11 Claims**



1. A semiconductor device comprising:

a body of semiconductor material having first and second major opposing surfaces and a peripheral edge extending therebetween, said body initially having a one type conductivity;

a first region having a second type conductivity extending within said body, said first region forming a first PN junction with said body at the interface therewith, said junction comprising an edge segment extending substantially perpendicular to said first surface, a bottom segment extending substantially parallel with said first surface and a radius segment connecting said edge segment and said bottom segment;

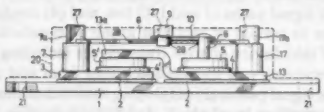
a contoured portion of said edge, said contour beginning at said first surface in said region and extending toward said second surface to a first terrace, said first terrace intersecting said edge segment of said first PN junction, said contour, from a point near said intersection, further extending toward said second surface to a second terrace, said contour being concave between said intersection and said second terrace.

4,047,197

HOUSING AND LEAD STRUCTURE FOR A SERIES CONNECTED SEMICONDUCTOR RECTIFIER ARRANGEMENT

Winfried Schierz, Roth, Germany, assignor to SEMIKRON Gesellschaft fur Gleichrichterbau und Elektronik m.b.H., Nurnburg, Germany

Filed Apr. 16, 1976, Ser. No. 677,851
Claims priority, application Germany, Apr. 19, 1975, 7512573[U]
Int. Cl.² H01L *23/02, 23/28, 23/16, 39/02*
U.S. Cl. 357—81 **19 Claims**



1. A semiconductor rectifier arrangement comprising in combination:

a metal base plate;

a layer of electrically insulating but thermally conductive material fastened to the upper surface of said base plate;

a pair of electrical contact layers fastened to the surface of said layer of insulating material and electrically isolated from one another;

a pair of semiconductor rectifier devices, each having at least one pn junction and a connecting contact on each of its two opposite major surfaces, each of said semiconductor devices being mounted on and having one of its said connecting contacts electrically connected to a respective one of said electrical contact layers;

conductive means for electrically connecting one connecting contact on one of said semiconductor rectifier devices to one connecting contact on the other of said semiconductor rectifier devices to connect said semiconductor devices in a series circuit;

first, second and third current conducting terminals connected to the input of said series circuit, to the output of said series circuit, and to said conductive means, respectively, said first, second and third current conducting terminals being arranged in a row with each of the two outer current conducting terminals of said row being electrically conductively connected to one of said electrical contact layers; and

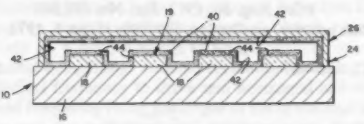
a plastic housing connected to said base plate and in which said series circuit, including its connecting parts is disposed.

4,047,198

TRANSISTOR COOLING BY HEAT PIPES HAVING A WICK OF DIELECTRIC POWDER

Kalwant S. Sekhon, Fullerton; Lloyd A. Nelson, Villa Park, and John E. Fritz, Jr., Anaheim, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 19, 1976, Ser. No. 678,336
Int. Cl.² H01L *23/02, 25/04*
U.S. Cl. 357—82 **8 Claims**



1. A microelectronic package capable of operating with power densities extending at least to 10 kW/cm² comprising:

means for defining a sealed enclosure coupled to an external heat sink;

means for defining electronic devices and circuitry sealed within said enclosure means;

electrical coupling means from said electronic devices and circuitry means and extending outside of said enclosure means for electrically coupling said electronic devices and circuitry means to further electronic circuits;

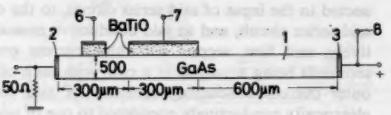
means including dielectric powder adhered substantially to all interior surfaces of said enclosure means and to all exposed surfaces of said electronic devices and circuitry means for defining a heat pipe wick substantially completely and conformally coating said interior and exposed surfaces; and

means for defining a dielectric working fluid in said enclosure means and intimately contactable with all said interior and exposed surfaces, thereby for minimizing the occurrence of local hot spots on said electric devices and circuitry means and for maximizing heat transfer therefrom to said external heat sink.

4,047,199
SEMICONDUCTOR DEVICE

Shoei Katsoka, Tanashi; Yasuo Komaniya, Kikuna; Nobuo Hashizume, Higashikurume; Kazutaka Tomizawa, Kamagaya, and Mitsuo Kawashima, Tokorozawa, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Division of Ser. No. 417,300, Nov. 19, 1973, abandoned, which is a continuation of Ser. No. 165,636, July 23, 1971, abandoned.
This application Oct. 1, 1975, Ser. No. 618,554
Claims priority, application Japan, July 23, 1970, 45-63955; Feb. 27, 1971, 46-9661
Int. Cl.² H01L 27/26, 47/00
U.S. Cl. 357—3 13 Claims

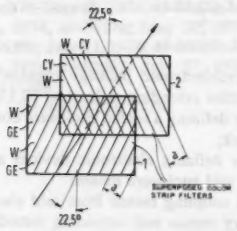


1. A bulk semiconductor device comprising in combination, a semiconductor element exhibiting a negative conductivity under a high electric field and being capable of generating a high electric field domain therein, two ohmic electrodes one at either end of said semiconductor element disposed to apply a bias voltage, at least one means for generating a high electric field domain in said semiconductor element by means applying an input signal to increase the electrical field in a region adjacent the generating means, at least one means for inhibiting the generation of a high electric field domain in said semiconductor element by means applying another input signal to increase the electric field in a region adjacent the inhibiting means, and means for detecting the existence of the high electric field domain in said semiconductor element to produce an output signal.

4,047,200
SINGLE TUBE COLOR TELEVISION CAMERA WITH COLOR STRIP FILTERS

Michael Koubek, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 30, 1973, Ser. No. 392,860
Claims priority, application Germany, Sept. 6, 1972, 2243698
Int. Cl.² H04N 9/07
U.S. Cl. 358—47 2 Claims

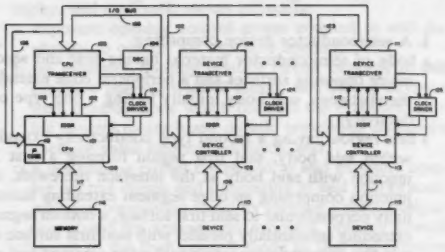


1. A single tube color television camera comprising a picture tube and two color strip filters disposed one behind the other on the optical image axis, said color strip filters having different color filters effects, both of said filters being oriented at the same angle of rotation in respect of the vertical image axis and oriented in opposite directions with respect to each other, whereby the output signal of the picture tube is composed of three frequency spectrums which are interleaned with each other in the frequency axis, a first of said frequency spectrums corresponding to a luminance signal and consists of spectral lines for integral multiples of the line frequency, and the other two frequency spectrums corresponding to respective color signals and consist of spectral lines which occur in the individual frequency spectrum and in intervals of the value of the line frequency and shifted in respect of the spectral lines of said first frequency spectrum by a fraction of the line frequency in opposite directions for the two color signals, and said television camera further comprising a decoding arrangement including a comb filter for splitting the output signals of the picture tube, said comb filter including an input connected to receive the output signal of the picture tube, a first output for said luminance signal, a second output for one of said color signals, and a third output for the other of said color signals, so that all three frequency spectrums are available at said outputs in their entire scope and separated from each other.

4,047,201
I/O BUS TRANSCEIVER FOR A DATA PROCESSING SYSTEM

Natalio Kerllenevich, Lexington, Mass., assignor to Data General Corporation, Westboro, Mass.

Filed Feb. 27, 1976, Ser. No. 662,177
Int. Cl.² G06F 3/04
U.S. Cl. 364—200 11 Claims



1. In a data processing system including (*a*) CPU, (*b*) a main memory interfacing with said CPU, (*c*) I/O means, incuding a plurality of device controllers, for connecting between said CPU and a like plurality of peripheral devices, and (*d*) a clock source, transceiver means contained within said I/O means for serially transmitting and receiving unmodulated signals between said CPU and said plurality of device controllers, said transceiver means comprising:

a CPU transceiver;

a first group of conductors for connecting said CPU transceiver from said CPU;

a like plurality of device control transceivers;

a like plurality of second groups of conductors each of said second groups for connecting each of said device control transceivers to each of said device controllers respectively;

an I/O bus connected at least between said CPU transceiver and said device control transceivers, said I/O bus including multiple data signal paths, clock signal paths, and control signal paths;

said CPU transceiver including means for (1) receiving pulses from said clock source, (2) employing said pulses as a local clock, (3) transmitting said pulses to one of said clock signal paths of said I/O bus, and (4) conducting said pulses to certain of said first group of conductors;

each of said device control transceivers including means for (1) receiving said transmitted pulses from said one of said clock signal paths, (2) employing said transmitted pulses as its respective local clock, and (3) conducting said transmitted pulses to certain conductors of a respective one of said second groups of conductors;

said CPU transceiver including mode control means normally operative to maintain said CPU transceiver in a receiving mode and responsive to a mode control signal on one of said conductors of said first group for establishing a transmit mode for said CPU transceiver; and, each of

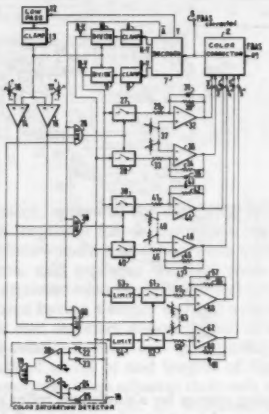
said device control transceivers including other mode control means normally operative to maintain said device control transceivers in a receiving mode and responsive to other mode control signals from respective ones of said device controllers for establishing a transmit mode for respective ones of said device control transceivers.

4,047,202

AUTOMATIC COLOR BALANCING SYSTEM

Dieter Poetsch, Ober Ramstadt, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 7, 1975, Ser. No. 620,409
Claims priority, application Germany, Oct. 11, 1974, 2448505
Int. Cl.² H04N 9/535
U.S. Cl. 358—29 **17 Claims**



1. A system for automatic correction of at least two color difference signals which determine the color and luminosity of a color television signal comprising:

A. first means responsive to said signal for providing a first indication when a predetermined luminosity gradation is present in a picture represented by said signal,

B. second means responsive to the color difference signals for providing a second indication when said at least two color difference signals remain within respective predetermined color saturation thresholds,

C. storage means responsive to the simultaneous presence of the first and second indications for storing values indicative of the chromaticity of said picture prevailing at that moment,

D. deriving means for deriving a regulating signal as a function of the stored value of the chromaticity, and

E. adjusting means responsive to the regulating signal for correcting defects in the color balance of the signals that determine color and luminosity of the color television picture,

wherey defects in the color and luminosity of the picture are lessened.

4,047,203

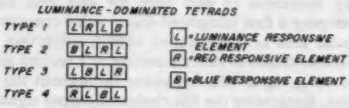
COLOR IMAGING ARRAY

Peter L. P. Dillon, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 12, 1976, Ser. No. 685,824
Int. Cl.² H04N 9/07
U.S. Cl. 358—44 **8 Claims**

1. A color imaging device comprising a rectangular array of interrogable photoelectric elements, such elements being selectively responsive to respective colors which correspond to a preselected three color basis, one color of which corresponds essentially to luminance;

said elements being arranged in a configuration wherein alignments along one major dimension of the array consist essentially of a repeated four element grouping having


LUMINANCE-DOMINATED TETRADS
TYPE 1 L R L B
TYPE 2 B L R L
TYPE 3 L B L R
TYPE 4 R L B L
L = LUMINANCE RESPONSIVE ELEMENT
R = RED RESPONSIVE ELEMENT
B = BLUE RESPONSIVE ELEMENT

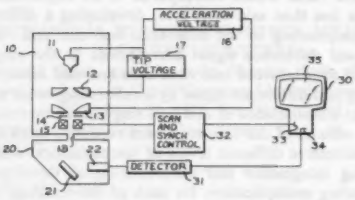
two luminance-responsive elements alternating with elements responsive respectively to the other two colors of said basis, each successive such alignment being shifted by one element position but otherwise having substantially the same color pattern.

4,047,204

VARIABLE INTERLACE DISPLAY

James J. Gold, Mountain View, Calif., assignor to American Optical Corporation, Southbridge, Mass.

Continuation of Ser. No. 534,975, Dec. 20, 1974, abandoned.
This application Sept. 7, 1976, Ser. No. 720,912
Int. Cl.² H04N 3/16
U.S. Cl. 358—93 **3 Claims**



1. In apparatus for varying according to a predetermined selection range the interlace rate of a rastered display, such as on a cathode ray tube including a horizontal deflection control circuit and a vertical deflection control circuit connected respectively to a horizontal drive and a vertical drive, the improvement comprising: variable oscillation means to generate a principal frequency to drive said horizontal and vertical drives, said frequency being a multiple of the horizontal deflection rate and the predetermined interlace rates; horizontal counter means for reducing the oscillation frequency to a frequency equal to the horizontal rate for the predetermined interlace rate; vertical counter means for reducing the oscillation frequency equal to the vertical rate for the predetermined interlace rate; and control means for said vertical counter and said oscillation means which cause the quotient of said horizontal rate divided by said vertical rate to be a fractional number, the fractional portion of which represents the desired interlace rate.

4,047,205

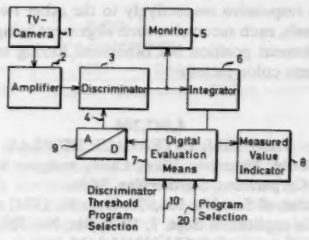
METHOD AND MEANS FOR MEASURING SUBSTANCE VOLUMES IN LIGHT-TRANSMITTING SAMPLES

Rudolf Grosskopf, Koenigsbronn, Germany, assignor to Carl Zeiss-Stiftung, Oberkochen, Wurttemberg, Germany

Filed Apr. 7, 1976, Ser. No. 674,841
Claims priority, application Germany, Apr. 9, 1975, 2515513
Int. Cl.² H04N 7/18
U.S. Cl. 358—107 **12 Claims**

1. In the method of measuring substance volumes in light-transmitting objects through electronic-image analysis within a field of raster-scanned subject matter, in which each scanning line lying within the boundaries of an object to be evaluated

supplies by means of a discriminator a binary signal corresponding to the line length between object-boundary intercepts for the particular line, the improvement which comprises subjecting at least the object region of the field to a first frame of raster scanning at a first amplitude level of video-signal discrimination throughout said first frame scan, integrating the discriminator output signal for all scan lines between the object-boundary intercepts of said lines for said first frame, thereby developing a first integrated-frame value corresponding to the total area of the scanned object; subjecting said region to a second frame of raster scanning at a second amplitude level of video-signal discrimination throughout the second frame scan, integrating the discriminator-output signal for all scan lines between the object-boundary intercepts of said lines for said second frame, thereby developing a second integrated-frame value which corresponds to an object-scanned area that is less than said total area; developing a difference signal corresponding to the difference between said values, whereby said difference signal corresponds to the ring-like incremental area between said total area and said lesser area; multiplying said difference signal by a calibrating value which relates light-transmittance of said first ring-shaped incremental area with volume of the substance; and repeating such frame scans at successive different levels of discrimination with accompanying integration and difference-signal development and calibrating multiplication, for each of the resulting lesser ring-shaped incremental areas involved until no such incremental areas are applicable; and then adding the calibration-corrected values.

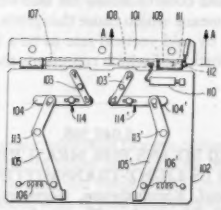


4,047,206

SINGLE LENS REFLEX CAMERA

Kazuo Kitagami, Tokyo; Katsuhiko Miyata, Tsurugashima, and Akihiro Arai, Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 17, 1976, Ser. No. 696,984
Claims priority, application Japan, June 17, 1975, 50-73437
Int. Cl.[2] G03B *19/12*
U.S. Cl. 354—152 4 Claims



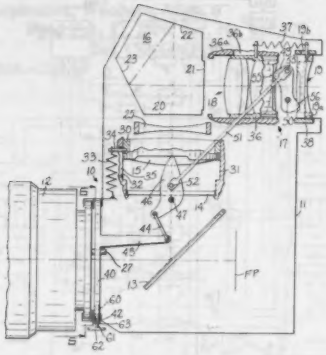
1. A single lens reflex camera system of the type having a camera body and multiple interchangeable lens systems for selective attachment to said camera body to accomplish different photography objectives, and a finder optical system receiving light having passed through the selected lens system and reflected towards said finder optical system by reflecting mirror means, said reflex camera system further including means active upon depression of a shutter release button to swing the mirror means away from the path of optical rays passing through said selected lens system, the improvement characterized by a set of individually removeable mirrors for selective placement in said camera body as the reflecting mirror means, said individual mirrors being different that one another to accomplish different photography objectives.

4,047,207

VIEWING SYSTEM FOR REFLEX CAMERA

Richard M. Altman, Woodland Hills, and Thomas D. McLaughlin, Thousand Oaks, both of Calif., assignors to Optigon Research & Development Corporation, Santa Monica, Calif.

Filed Jan. 13, 1976, Ser. No. 648,779
Int. Cl.[2] G03B *13/12, 19/12*
U.S. Cl. 354—155 20 Claims



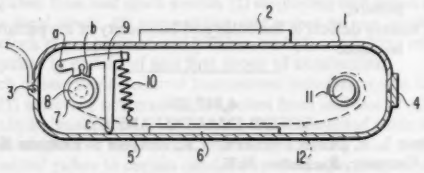
1. In a viewing system for a single lens reflex camera having a focal plane comprising a viewing screen, a field lens, a prism and an eyepiece, said camera having the ability to accept lenses having exit pupils of varying location with respect to the focal plane of said camera, the improvement comprising a movable field lens between said screen and said prism, and means for positioning said movable field lens between said prism and said screen as a function of the location of the exit pupil of a lens mounted to said camera.

4,047,208

SUPPORTING DEVICE FOR SUPPORTING A ROLL FILM IN A CAMERA

Heizo Kawaguchi, Oyaguchi Kita, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 11, 1975, Ser. No. 639,687
Claims priority, application Japan, Dec. 11, 1974, 49-150633[U]
Int. Cl.[2] G03B *1/00*
U.S. Cl. 354—203 4 Claims



1. In a camera of the type having, a support shaft for engaging and rotating with a film roll, a take-up spool for receiving the leader part of the film from said roll, and a back cover which can be opened to load and unload film rolls and is closed during picture-taking operation, the improvement comprising,

means operative only when said back cover is open to frictionally restrict the unwinding of said film from said roll, said means engaged with said support shaft only when said back cover is open.

4,047,209

FILM TRANSPORT

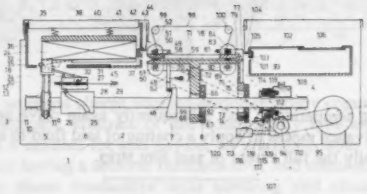
Abraham Groeneweg, Ridderkerk, Netherlands, assignor to N.V. Optische Industrie "De Oude Delft", Netherlands

Filed May 16, 1975, Ser. No. 578,012

Claims priority, application Netherlands, May 20, 1974, 7406745

Int. Cl.[2] G03B 1/00

U.S. Cl. 354—212 **1 Claim**



1. In a camera, apparatus for supplying and discharging predetermined lengths of film to and from a position between an exposure window and a hold-down frame movable towards, and away from, said exposure window, there being a gap between said exposure window and said hold-down frame, said hold-down frame having a supply end and a discharge end, at each of which ends there are disposed a pair of shafts in tranverse parallel relationship to, and on opposite sides of, the plane of a path of travel of said lengths of film, said shafts carrying transporting rollers adjacent their ends with opposing rollers movable into, and out of, cooperative association, means for separating a length of film from a stack in a supply cassette and transporting the separated length of film from said supply cassette to within reach of the transporting rollers on said supply end, a stop on the discharge end of said gap, downstream of the transporting rollers, said stop being movable to a position in the path of travel of the lengths of film for retaining a length of film, and to a position outside said path of travel for allowing the discharge of a length of film from said gap to a collecting cassette disposed on the discharge end of said gap, a motor operatively associated with a mainshaft, cam disks on said mainshaft for respectively moving said hold-down frame, said means for separating and transporting a length of film, said stop, and said transporting rollers relatively to each other, the rotary movements of said transporting rollers and of said mainshaft being derived from a power take-off shaft of said motor, and characterized in that, in operation, said motor runs at a constant speed, and in that said mainshaft is coupled to said power take-off shaft of the motor by a single-stroke clutch operable by electromagnetic means.

4,047,210

CAMERA WITH AN ELECTRONIC TIMER AND INCLUDING AN ELECTRO-MECHANICAL DELAYED ACTION STOP FOR THE SHUTTER DRIVE

Winfried Espig, Calmbach, Black Forest, Germany, assignor to Prontor-Werk, Alfred Gauthier GmbH, Postfach, Germany

Continuation of Ser. No. 143,200, May 13, 1971, abandoned, which is a continuation of Ser. No. 770,737, Oct. 25, 1968, abandoned. This application June 19, 1975, Ser. No. 588,269

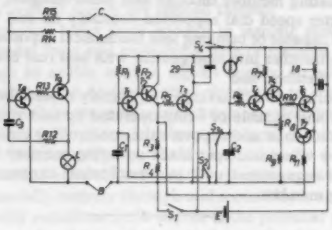
Claims priority, application Germany, Oct. 26, 1967, 1597365

The portion of the term of this patent subsequent to July 27, 1988, has been disclaimed.

Int. Cl.[2] G03B 9/64

U.S. Cl. 354—238 **5 Claims**

1. A camera having an electronic timer controlled by ambient light including an electro-mechanical delayed action stop for the shutter to stop the action of the shutter upon shutter release, an electronic delay device for delaying temporarily the action of the shutter after shutter release, and electronic switching means, including a battery-energizable signal lamp, responsive to the action of said delay device, and having means electronically controlled in dependence upon the action of said



delay device for specifically generating distinctive and different light signals via said lamp respectively during the action of said delay device and the subsequent exposure period whereby to indicate to the operator the corresponding state of the shutter action continuously throughout the duration of the shutter operation upon shutter release and during both the action of said delay device and the subsequent exposure period.

4,047,211

MECHANICAL EXPOSURE CONTROL MEANS FOR ELECTRIC SHUTTERS

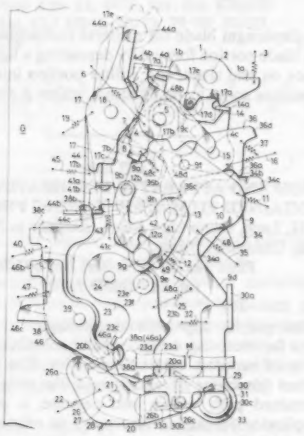
Nobuyoshi Inoue, and Munetaka Shimizu, both of Kawagoe, Japan, assignors to Copal Company Limited, Japan

Filed Sept. 26, 1975, Ser. No. 617,165

Claims priority, application Japan, Sept. 28, 1974, 49-116348[U]

Int. Cl.[2] G03B 9/58

U.S. Cl. 354—258 **4 Claims**



1. A mechanical exposure control means for electric shutters comprising:

a base plate,

a front blade actuating member supported rotatably on said base plate and movable between its released position and cocked position, rear blade actuating member supported rotatably on said base plate and movable between its released position and cocked position,

a mechanical exposure controlling member supported rotatably on said base plate and capable of locking said rear

blade actuating member in its cocked position by directly engaging with said rear blade actuating member and capable of being moved by said front blade actuating member in order to release said rear blade actuating member,

an exposure time controlling circuit including an RC delay circuit and an electromagnet therein and capable of electrically controlling the operation time of said rear blade actuating member through said electromagnet,

a shutter speed dial supported rotatably on said base plate and capable of bringing said mechanical exposure controlling member into engagement with said rear blade actuating member, and

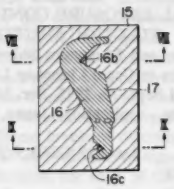
an auxiliary switch arranged adjacently to said shutter speed dial and capable of being operated by said shutter speed dial to make said exposure time controlling circuit inoperative when said rear blade actuating member is brought into engagement with said mechanical exposure controlling member.

4,047,212

DIAPHRAGM BLADE FOR CAMERAS AND METHOD OF MAKING THE SAME

Misao Yamada, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Feb. 4, 1976, Ser. No. 655,016
Claims priority, application Japan, Feb. 6, 1975, 50-15715
Int. Cl.² G03B 9/02
U.S. Cl. 354—270 **9 Claims**



9. A diaphragm blade for cameras comprising an ND filter sheet, a blade portion formed by depositing a light intercepting substance on said sheet, and a filter portion integral with said blade portion so as to be effective within a small diaphragm range.

4,047,213

METHOD AND APPARATUS FOR HEATING CASSETTE CONTAINED FILM STRIP DURING PROCESSING

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 9, 1976, Ser. No. 647,740
Int. Cl.² G03D 13/00
U.S. Cl. 354—299 **10 Claims**

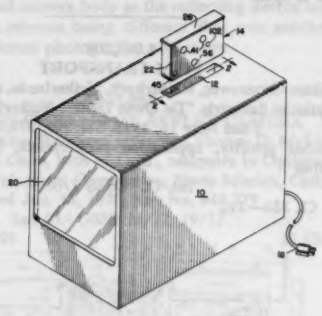
9. Photographic apparatus comprising:

means for receiving a film cassette containing an elongated strip of exposed, undeveloped film, film advance means when driven for advancing said film strip along a predetermined path within said cassette, a processing fluid applicator actuatable responsive to advancement of said film strip for applying a coating of processing fluid to said film strip to develop said film strip, a heating element energizeable to increase the temperature of said processing fluid, and externally accessible contacts electrically coupled to said heating element;

selectively operative means for driving said film advance means;

switch means actuatable for coupling said contacts to an electrical source to heat said element; and

means for controlling said switch means and said driving means to energize said heating element and initially drive said film advance means to actuate said fluid applicator, then halt said driving of said film advance means for an interval during which said element is raised to its operating temperature, and subsequently again drive said film advance means to apply a coating of said fluid to substantially the full extent of said film strip.

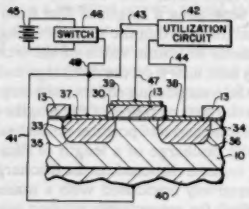


4,047,214

ELECTROSTATICALLY BONDED DIELECTRIC-ON-SEMICONDUCTOR DEVICE, AND A METHOD OF MAKING THE SAME

Maurice H. Francombe, and Shu-Yau Wu, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 4, 1975, Ser. No. 610,364
Int. Cl.² H01L 29/78, 27/12, 29/84, 23/48
U.S. Cl. 357—23 **7 Claims**



1. An electrostatically bonded ferroelectric-on-semiconductor field-effect transistor comprising:

A. a ferroelectric body of a bulk material having opposed first and second major surfaces with at least said first major surface of planar configuration, and having ferroelectric properties;

B. a semiconductor body of a bulk material and given conductivity type and having opposed first and second major surfaces with at least said first major surface of planar configuration, said first major surface being electrostatically bonded to said first major surface of said body;

C. at least one electrode, such as a gate electrode, ferroelectric substrate to provide for interaction between transport carriers in the semiconductor body and electrical polarization changes in the ferroelectric body;

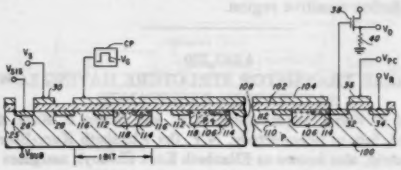
D. source and drain impurity regions of conductivity type opposite to said semiconductor body, said impurity regions spaced apart in said semiconductor body adjoining said first major surface; and

E. source and drain electrodes positioned on said first major surface of the semiconductor body to make ohmic contact with said source and drain impurity regions, respectively, spaced apart from each other with said ferroelectric body positioned at least therebetween.

4,047,215
UNIPHASE CHARGE COUPLED DEVICES

Robert Charles Frye, Plano; Horng-Sen Fu, Dallas, and Al F. Tasch, Jr., Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 31, 1975, Ser. No. 545,954
Int. Cl.[2] H01L 29/78, 29/04; G11C 19/28
U.S. Cl. 357—24 9 Claims

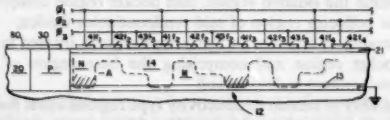


1. A uniphase charge coupled device structure comprising a semiconductor substrate of one conductivity type including therein a channel for said device, an insulating layer on said substrate having a uniform thickness over said channel, a continuous planar conductive layer covering said channel for receiving charge transfer clock pulses, said planar conductive layer being separated from said channel only by said insulating layer, said substrate further including input structure for inputting charge packets to one end of said channel and output structure for extracting charge packets from the opposite end of said channel, and wherein along the length of said channel first substrate regions are separated by second substrate regions comprising packets of semiconductor material of said one conductivity type and having higher impurity concentration than said substrate, each of the first and second regions including a transfer and storage portion at the interface of the insulating layer and the regions, the transfer portion of a region located between the input structure and the storage portion of a region, a layer of immobile charge comprised of dopant impurities of opposite conductivity type from that of said substrate included in the storage portion of each first region but not in the transfer portion of any first region, and included in the storage and transfer portions of said second regions, said layer of immobile charge having a higher impurity concentration in the storage portion of each second region that the transfer portion of a second regions.

4,047,216
HIGH SPEED LOW CAPACITANCE CHARGE COUPLED DEVICE IN SILICON-SAPPHIRE

Barry T. French, Ontario, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 457,675, April 3, 1974, abandoned. This application Jan. 20, 1976, Ser. No. 650,594
Int. Cl.[2] H01L 29/78; G11C 19/28; H01L 27/12
U.S. Cl. 357—24 2 Claims

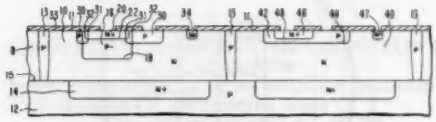


1. In combination:
an electrically insulating substrate;
a strip of material capable of supporting charge coupled device action disposed on said substrate and comprising a charge transfer channel of a charge coupled device;
said strip including a first layer of semiconductor material adjacent said substrate having relatively high conductivity and a second layer of semiconductor material which has a relatively low conductivity;
insulation means disposed on said strip of material and on said substrate;
a set of charge coupled device control electrodes disposed on said insulation means for controlling the transfer of charge within said charge transfer channel when appropriate control signals are applied thereto;
said insulation being thick enough to insulate said control electrodes from said underlying strip of material and thin enough to enable control signals applied to said set of charge coupled device control electrodes to control the transfer of charge within said charge coupled device; and
said second layer of semiconductor material is thin enough that when control potentials are applied to the device, all of potential wells of the charge coupled device will extend substantially entirely through said second layer at all times whereby variations in the depths of the potential wells are accommodated by variations in the depth of the penetration of said potential wells into said first layer of semiconductor material whereby transfer inefficiencies induced by traps in the second layer of said semiconductor material are minimized by avoiding repetitive filling and emptying of those traps.

4,047,217
HIGH-GAIN, HIGH-VOLTAGE TRANSISTOR FOR LINEAR INTEGRATED CIRCUITS

Terence McCaffrey, Cupertino; Hassan Raza, Sunnyvale, and Bruce C. Williams, San Jose, all of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Apr. 12, 1976, Ser. No. 676,038
Int. Cl.[2] H01L 29/72, 29/00, 27/02
U.S. Cl. 357—34 13 Claims



1. An improved bipolar transistor device having a high breakdown voltage and high gain comprising:
a first collector region of semiconductor material of one conductivity type having a principal surface;
a second base region of opposite conductivity type located within the first collector region and forming a first p-n junction herewith that has an edge at the principal surface, the second base region having a relatively low charge density;
a third emitter region of one conductivity type located within the second base region and forming a second p-n junction therewith that has an edge at the principal surface; and a fourth base region of opposite conductivity type located along a portion of the principal surface abutting the entire periphery of said third region and extending into portions of the first, second, and third regions, the fourth region having a charge density about an order of magnitude greater than that of the second region, said fourth base region and said second base region providing the equivalent of a base function with a dual charge density.

4,047,218

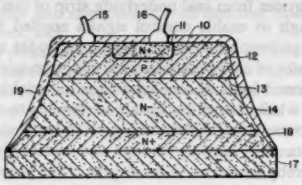
SEMICONDUCTOR DEVICES WITH IMPROVED TURN-OFF CHARACTERISTICS

Lowell E. Clark; Raymond M. Roop, and Charles E. Volk, all of Scottsdale, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 543,584, Jan. 23, 1975, abandoned. This application July 16, 1976, Ser. No. 705,970

Int. Cl.[2] H01L *29/72, 29/48, 29/90, 23/48*

U.S. Cl. 357—34 **5 Claims**



1. In a high voltage semiconductor device including a first region of first conductivity-type, a second semiconductor region of second conductivity-type having at least lightly-doped portion, said lightly-doped portion forming a p-n junction with said first region, and separate first and second metallic means for contacting respectively each of said first and second regions remote from their p-n junction, wherein the improvement comprises said second region having a net impurity doping density of said second type between 3×10^{12} and 10^{15} atoms per square centimeter between said p-n junction and said second metallic means.

4,047,219

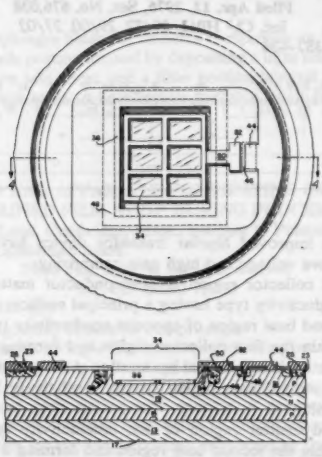
RADIATION SENSITIVE THYRISTOR STRUCTURE WITH ISOLATED DETECTOR

Victor A. K. Temple, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,135

Int. Cl.[2] H01L *29/74*

U.S. Cl. 357—38 **4 Claims**



1. A radiation sensitive semiconductor device comprising:
- a semiconductor substrate;
- a radiation sensitive region on said substrate operative to generate an electrical current in response to the incidence of radiation thereon;
- a gate region responsive to the flow of current therein to turn on said semiconductor device;
- an isolating region interposed between said radiation sensitive region and said region for increasing the lateral resistance of said substrate layer between said radiation sensitive region and said gate region to a value greater than the lateral resistance of the remainder of said substrate, said isolating region further characterized by a region of locally higher base resistance than the remainder of said substrate surrounding said radiation sensitive region and by a lower impurity concentration than the remainder of said substrate layer; and
- means for coupling said electrical current from said radiation sensitive region to said gate region for turning on said device in response to the incidence of radiation on said radiation sensitive region.

4,047,220

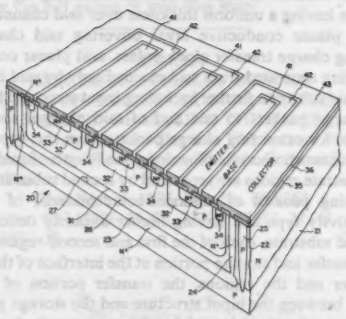
BIPOLAR TRANSISTOR STRUCTURE HAVING LOW SATURATION RESISTANCE

Armand P. Ferro, Schenectady, N.Y., and Bruno F. Kurz, deceased, late of Schenectady, N.Y. (by Elizabeth Kurz-Beerli, executrix, also known as Elizabeth Kurz Chinoy), assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,338

Int. Cl.[2] H01L *27/10*

U.S. Cl. 357—48 **7 Claims**

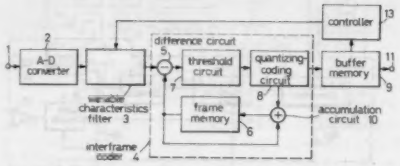


1. A monolithic semiconductor device structure characterized by low saturation resistance comprising:
- a first conductivity type substrate;
- a second conductivity type epitaxial layer on said substrate;
- a buried layer region of second conductivity type and substantially lower resistivity than said epitaxial layer selectively positioned between said epitaxial layer and said substrate;
- a narrow region of first conductivity type extending from the surface of said epitaxial layer through said layer to said substrate and isolating a portion of said epitaxial layer from other portions of said substrate and epitaxial layer;
- a deep collector contact region of second conductivity type extending from the surface of said epitaxial layer, partially through said layer and contacting said buried layer region;
- a pocket region of second conductivity type and substantially lower resistivity than said epitaxial layer formed within the isolated region, said pocket region comprising the collector region of said semiconductor device;
- a plurality of first conductivity type regions formed in said pocket region and comprising the base region of said semiconductor device; and
- a plurality of second conductivity type regions a first portion thereof formed in said plurality of first conductivity type regions and comprising the emitter region of said device and a second portion thereof formed in said pocket region and interdigitated with said plurality of first conductivity type regions, said second portion comprising portions of said collector region, said plurality of first conductivity type regions and said plurality of second conductivity type regions forming interdigitated base, emitter and collector regions.

4,047,221
INTERFRAME CODING APPARATUS

Hiroshi Yasuda, Tokorozawa, and Fumio Kanaya, Tokyo, both of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Sept. 30, 1976, Ser. No. 728,082
Claims priority, application Japan, Oct. 6, 1975, 50-120458
Int. Cl.[2] H04N 7/12
U.S. Cl. 358—136 8 Claims

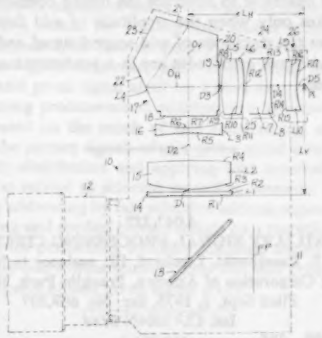


1. Interframe coding apparatus comprising:
a variable characteristics filter supplied with an input signal and capable of changing its filtering characteristic with a control signal;
a coder connected to the output side of the variable characteristics filter to encode the filtered output into an interframe code;
a buffer memory connected to the output side of the coder, the output code of the coder being written in the buffer memory and read out therefrom at a constant bit rate; and
a controller connected between the buffer memory and the variable characteristics filter to detect the occupancy of the buffer memory and generate the control signal.

4,047,222
CAMERA VIEWFINDING SYSTEM

Jacob Moskovich, Hollywood; Gary E. Wiese, Canoga Park; Richard M. Altman, Woodland Hills, and Thomas D. McLaughlin, Thousand Oaks, all of Calif., assignors to Optigon Research & Development Corporation, Santa Monica, Calif.

Filed Jan. 13, 1976, Ser. No. 648,780
Int. Cl.[2] G03B 13/06, 19/12
U.S. Cl. 354—155 12 Claims

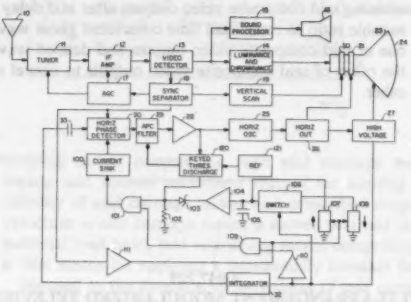


1. A viewfinder system for a single lens reflex camera having a defined image frame comprising a substantially rectangular focusing screen of dimensions essentially equal to the image frame of the camera, a field lens, a pentaprism having substantially rectangular entrance and exit surfaces of essentially the same width, and reflecting surfaces therebetween, and an eyepiece disposed behind said exit surface, all on an optical axis which is changed from normally vertical to normally horizontal in said prism, a lens of negative power disposed between said field lens and said entrance surface, said entrance surface having an area substantially less than the area of said screen, said exit surface having a height of at least 0.70 of the height of said entrance surface.

4,047,223
FREQUENCY SCANNING AUTOMATIC PHASE CONTROL SYSTEM

Judson A. Hofmann, Schaumburg, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 16, 1976, Ser. No. 649,954
Int. Cl.[2] H04N 5/05; H01S 1/00; H03F 3/68
U.S. Cl. 358—158 14 Claims

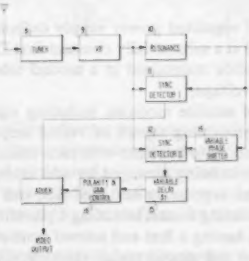


8. In an automatic phase control system including an oscillator producing a pulse signal, a phase detector and filter synchronizing the output of said oscillator with a source of synchronizing pulse information, the improvement comprising:
coincidence means detecting coincidence between said oscillator pulse and said synchronizing pulse information;
lock detecting means determining the existence of an out-of-sync condition by comparing the relative durations of intervals of coincidence and non-coincidence; and
configuring means responsive to said coincidence means and said lock detecting means causing cyclic variation of said oscillator frequency only if an out-of-sync condition and non-coincidence simultaneously occur.

4,047,224
GHOST REMOVING SYSTEM FOR USE IN TELEVISION RECEIVER

Namio Yamaguti, Ibaragi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 26, 1976, Ser. No. 661,598
Claims priority, application Japan, Feb. 28, 1975, 50-25136
Int. Cl.[2] H04N 5/14
U.S. Cl. 358—166 18 Claims



1. A method for removing a ghost wave received together with a desired wave in a television receiver, comprising the steps of
synchronously detecting a video intermediate frequency

signal in the television receiver at a first reference phase to provide a first composite video output;

synchronously detecting the video intermediate frequency signal at a second reference phase, which differs from said first reference phase by an angle corresponding to a phase difference between the ghost wave and the desired wave, to provide a second composite video output;

delaying at least one of said video intermediate frequency signal, said first composite video, and said second composite video, an amount to cause said ghost wave in one of said composite video outputs to be in time coincidence with the desired wave in the other of said composite video outputs, and

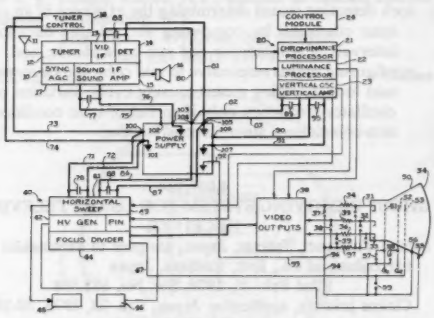
combining said composite video outputs after said delay in a suitable ratio to cause said time coincident ghost wave in one of said composite video outputs and desired wave in the other of said composite video outputs to cancel each other.

4,047,225

MULTI-ARRANGEMENT MODULARIZED TELEVISION RECEIVER

Daniel I. Pittenger, Libertyville, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 2, 1976, Ser. No. 645,978
Int. Cl.² H04N 3/18
U.S. Cl. 358—190 **6 Claims**



1. A television receiver comprising:

display means including a cathode ray tube susceptible to arcing;

a centralized regulated power supply defining a first node maintained at a substantially constant first DC voltage and a second node maintained at a second substantially constant DC voltage;

a plurality of satellite modules, including signal translating circuitry processing signals of varied amplitude and frequency tending to interfere with each other, said circuitry susceptible to being damaged by said arcing;

support means supporting said modules; and

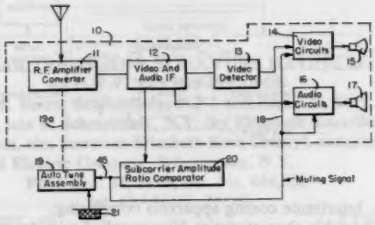
flexible connecting means, including a plurality of conductor pairs each having a first and second conductor connected to said first and second nodes, respectively, said conductor pairs providing individual operating voltage and isolated ground return connections for each of said modules exclusive of said support means thereby avoiding interference of said signals, minimizing damage to said circuitry, permitting multiple arrangements of said modules.

4,047,226

TELEVISION SIGNAL-SEEKING AUTOMATIC TUNING SYSTEM

Rhey Warren Hedges, Miami, Fla., assignor to Louis W. Parker, Fort Lauderdale, Fla.

Continuation-in-part of Ser. No. 627,318, Oct. 30, 1975, abandoned. This application Aug. 23, 1976, Ser. No. 716,862
Int. Cl.² H04N 5/44, 3/24
U.S. Cl. 358—193 **15 Claims**



1. In an intercarrier television receiver of the type comprising tunable signal translating means responsive to correct reception of a television transmission for producing picture subcarrier and sound subcarrier signals having frequencies spaced from one another by an intercarrier frequency, a signal seeker coupled to said tunable signal translating means for continuously varying the tuning of said receiver over a predetermined television frequency spectrum, and a control circuit for interrupting the tuning operation of said signal seeker at points of correct tuning in said spectrum, the improvement wherein said control circuit comprises first tuned circuit means coupled to said signal translating means and tuned to the frequency of said picture subcarrier for producing a first signal having an amplitude related to the amplitude of said picture subcarrier, second tuned circuit means coupled to said signal translating means and tuned to the frequency of said sound subcarrier for producing a second signal having an amplitude related to the amplitude of said sound subcarrier, and comparator means for monitoring the comparative amplitudes and the amplitude ratio of said first and second signals, said comparator means including signal generating means for producing a control signal operative to interrupt the tuning operation of said signal seeker only when the amplitude of said first signal is higher than the amplitude of said second signal and said first and second signal amplitudes are in a predetermined ratio to one another.

4,047,227

AUXILIARY SIGNAL PROCESSING CIRCUIT

Theodore S. Rzeszewski, Lombard, Ill., assignor to Matsushita Electric Corporation of America, Franklin Park, Ill.

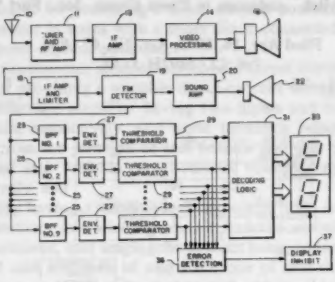
Filed Sept. 2, 1975, Ser. No. 609,307
Int. Cl.² H04N 5/44
U.S. Cl. 358—194 **16 Claims**

9. A wave signal receiver including means for receiving auxiliary signals always comprising various combinations of exactly N signals out of a total of M possible signals, where N and M each are positive integers greater than one and N is less than M, said receiver including in combination:

M first means for identifying each of said M auxiliary signals and producing output signals in response to such identification unique to each of said M auxiliary signals;

second means for simultaneously supplying the N signals of each auxiliary combination to said M first means;

third means coupled with said M first means and responsive to different combinations of N auxiliary signals identified



by said first means for producing a unique output signal for each different combination of N signals.

4,047,228

RECEIVING SYSTEM FOR FACSIMILE AND THE LIKE

Tohmi Yagishita, and Hiroshi Hagiya, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Aug. 13, 1975, Ser. No. 604,119
Claims priority, application Japan, Aug. 20, 1974, 49-95159
Int. Cl.² H04N *1/40, 7/12*
U.S. Cl. 358—261 **3 Claims**

A	B_1	C	A	B_2	C_2	A	B_2	C_3

1. A receiver in a facsimile system which transmits signals corresponding to a plurality of scanning lines via a continuous serial repetition of signal arrays, each signal array corresponding to a given scanning line and including a synchronizing signal, group weight indicator signals, and picture signals corresponding to that line, said receiver including means for receiving and processing each given signal array comprising: means for receiving said synchronizing signal of said given signal array; means for receiving said group weight indicator signals of said given signal array which follow said synchronizing signal of said given signal array, and for storing said group weight indicator signals of said given signal array in a temporary memory; means for reading said stored group weight indicator signals from said temporary memory and for deciphering the signals thus read, prior to recording the picture signals of said given signal array on a recording paper; means for performing predetermined addition on a selective address register, based on the result of said deciphering; means for receiving the picture signals of said given signal array and for immediately distribution and applying said received picture signals upon receipt to selected recording elements in accordance with addressing by said selective address register; means for recording said applied picture signals on a recording paper, and; means for performing auxiliary scanning during a period for receiving said synchronizing signal and said group weight indicator signals of said given signal array.

4,047,229

VELOCITY CONTROLLED MANUAL MOVEMENT CREDIT CARD READER

Lawrence P. Kobylarz, Howell, and Ronald H. Mack, Plymouth, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

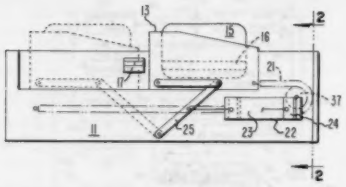
Filed Nov. 18, 1975, Ser. No. 633,129
Int. Cl.² G11B *19/24*
U.S. Cl. 360—2 **5 Claims**

1. A manually-operable credit card reader for reading information from an information bearing credit card comprising:

a base member;

carriage means adapted to carry an information bearing credit card, and slidably mounted on said base member for manual movement along a linear path;

an information read head mounted on said base member in alignment with the path of movement of the credit card and operable during said manual movement of said carriage means, for effectuating proper sensing of the information borne by the card; and



restraining means cooperating with said carriage means during said manual movement thereof for limiting the velocity of said carriage means to a prescribed range of velocities as said carriage means is moved past said informational read head, said restraining means comprising:

a. first means for applying a substantially constant force opposed to the direction of movement of said carriage means; and

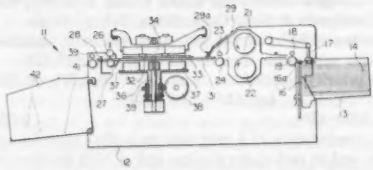
b. second means operating in parallel with said first means for applying a force responsive to the magnitude of velocity of said carriage means.

4,047,230

METHOD AND APPARATUS FOR TRANSFERRING MAGNETIC SIGNAL FROM A MASTER SHEET TO COPY SHEETS

Tsutomu Kume; Kazuo Kasai; Hidefumi Kaneko; Shigeo Sugiyama, and Shigeo Mithuhashi, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Nov. 26, 1976, Ser. No. 745,137
Claims priority, application Japan, Dec. 22, 1975, 50-151934
Int. Cl.² G11B *5/86*
U.S. Cl. 360—17 **11 Claims**



1. A method of transferring magnetic signals from a master sheet to a copy sheet, comprising the steps of:

a. pressing the master and copy sheets together;

b. applying a magnetic field to the master and copy sheets to transfer the magnetic signals from the master sheet to the copy sheet;

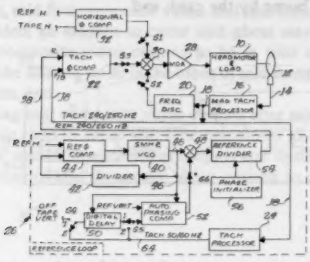
c. separating the copy sheet from the master sheet in a direction substantially perpendicular to surfaces of the master and copy sheets; and

d. moving the copy sheet away from the master sheet in a direction parallel to the surfaces of the master and copy sheets.

4,047,231
HIGH STABILITY DIGITAL HEAD SERVO FOR VIDEO RECORDERS

Gary B. Garagnon, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Mar. 19, 1976, Ser. No. 668,418
Int. Cl.[2] H04N 1/28; G11B 21/04
U.S. Cl. 360—36 10 Claims



1. A servo system for regulating an operating time variable of a driven load comprising:

means responsive to the driven load for providing a feedback signal at a rate that is proportional to the operating time variable of the load;

means responsive to a first standard rate signal for providing a reference signal of a rate which is equal in rate to that of said feedback signal, said first standard rate signal being related to the desired rate of rotation of the load;

first means for comparing said reference signal and said feedback signal and providing a first error signal indicative of the time difference between the rates of the compared signals;

means electrically coupling said first error signal provided by said comparing means to the load for driving the load such that said reference signal and said feedback signal are in locked synchronism; and

control means responsive to said feedback signal and a second standard rate signal for incrementally adjusting the rate of said reference signal in accordance with time variations in said feedback signal, and said second standard rate signal having a rate substantially lower than said first standard rate signal and having a timing related to the desired position of the angular position of the load.

4,047,232
LEADER TAPE

Yoshiaki Hisagen, Sendai, and Kazuo Hoshi, Iwanuma, both of Japan, assignors to Sony Corporation, Tokyo, Japan

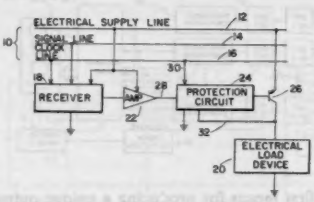
Continuation of Ser. No. 244,421, April 17, 1972, abandoned.
This application Oct. 6, 1975, Ser. No. 619,923
Claims priority, application Japan, Apr. 20, 1971, 46-25468
Int. Cl.[2] G11B 5/78
U.S. Cl. 360—134 5 Claims

1. In a combination of a magnetic recording tape for operation from reel to reel under tension and at high lineal velocity in cooperation with a magnetic recording and/or playback head and a flexible leader tape having a nonmagnetic light-transmissive base, the improvement comprising an abrasion resistant coating layer formed on the nonmagnetic base, the coating layer consisting of a binder of 100 parts by weight and a pigment of 50 to 400 parts by weight, in which the pigment and the coating formed therewith has a light color, the surface resistivity of the coating layer being less than 10^{12} ohms/sq. and the transmissivity of the coated leader tape being 20% or greater, said pigment including one or two of materials selected from zinc oxide, titanium oxide, calcium carbonate, zinc sulfide, silicon monoxide, antimony oxide, white lead, aluminum oxide, barium sulfate, lead sulfate, talc, clay, lithopone, and white carbon black.

4,047,233
SHORT CIRCUIT PROTECTION CIRCUIT

Robert G. Yorks, W. Bloomfield, and David W. Junker, Novi, both of Mich., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed Apr. 14, 1976, Ser. No. 676,824
Int. Cl.[2] H02H 3/20
U.S. Cl. 361—88 5 Claims



1. In a switching circuit for controlling the application of power to a load including a semiconductor switch in series with said load connected across a source of power, means for providing a clock signal switching between first and second states, means for providing a command signal switching from a first state to a second state when it is desired to energize said load, a protection circuit for protecting said semiconductor switch in the event said load is short circuited, comprising:

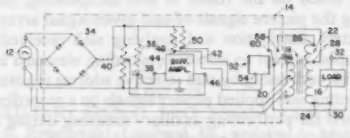
sensing circuit means for sensing the voltage across said load and for providing an output signal indicative of whether or not said load is shorted; and

circuit means responsive to the output signal of said sensing circuit, said command signal and said clock signal for actuating said semiconductor switch when said command signal switches from said first state to said second state or shortly thereafter, said circuit means thereafter maintaining said semiconductor switch in said actuated state as long as said command signal remains in said second state and the output of said sensing circuit means indicates said load is not shorted, said circuit means momentarily energizing said semiconductor switch when said command signal is in said second state and the output of said sensing circuit means indicates said load is short circuited.

4,047,234
LOW VOLTAGE PROTECTION CIRCUIT

Harry S. Oyler, 1004 St. Clair St., Manitowoc, Wis. 54220

Filed Mar. 26, 1976, Ser. No. 670,635
Int. Cl.[2] H02H 3/24
U.S. Cl. 361—92 1 Claim



1. In a load-protection circuit operative with an alternating-current voltage-source including circuit means for sensing an undervoltage condition to control the voltage supplied to the load upon occurrence of said undervoltage condition, the improvement comprising:

a transformer having input and output windings, said output winding having two output taps and at least one additional tap, said input winding being connected to said voltage source, the load being connected across one of said output taps and said additional tap, the other of said taps and said additional tap being connected to said circuit means for causing the latter to switch the load from said additional tap to said other of said taps upon occurrence of said

undervoltage condition, wherein the load has two terminals and said circuit means further includes:

a rectifier connected across said alternating current voltage source for providing a direct-current potential;

a resistor in series with a zener diode connected across said direct-current potential;

a potentiometer shunted across said direct current potential for providing a variable direct-current voltage output;

a difference amplifier having two inputs and output terminals, respectively, said input terminals being connected across the junction of said resistor and said zener diode, and said variable direct-current voltage output, respectively; and

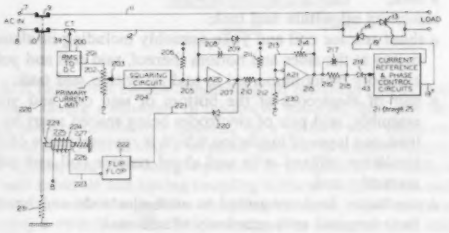
a relay having a winding and two single pole, double throw contacts, said winding being connected across said output terminals, said single pole contact being connected to one of said terminals of said load, one of said double throw contacts being connected to said additional tap, the other of said double throw contacts being connected to said other of said taps, whereby the voltage across the load is substantially restored to a normal condition.

4,047,235

CURRENT LIMIT AND OVERCURRENT CUT OFF SYSTEM

Richard Kent Davis, Salem, Va., assignor to General Electric Company, New York, N.Y.

Filed Aug. 13, 1976, Ser. No. 714,151
Int. Cl.² H02H 7/14
U.S. Cl. 361—100 **5 Claims**



1. In an electric power system, electric current is applied to an electric load through serially coupled circuit breaker contact means, adapted to be opened by a triggering circuit, and semiconductor switching means, regulated by a firing circuit, a control circuit for inhibiting the electric current in said power system from exceeding predetermined limit values, comprising:

a. first means responsive to the actual value of said electric current in said electric current circuit for deriving therefrom a DC signal having a magnitude dependent upon a predetermined non-linear function of said electric current;

b. integrating means comprising an input and an output;

c. clamping means for clamping the output of said integrating means at a first predetermined potential while said electric current has an actual value below said predetermined limit value;

d. said integrating means being responsive to said DC signal to commence integration in a first direction to modify the potential at said output when the actual value of said electric current attains said predetermined limit value and upon said actual value exceeding said predetermined value to attain at its output a second predetermined potential responsive to the time integral of a function of the value of electric current in excess of said predetermined limit value;

e. first circuit means coupled from the output of said integrating means being responsive to commencement of integration in said first direction by said integrating means to provide a current limit signal to said firing circuit to limit current in said electric power system within said predetermined limit value; and

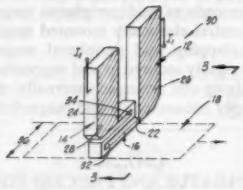
f. second circuit means coupled from the output of said integrating means being responsive to the output of said integrating means attaining said second predetermined potential to provide a trigger signal to said triggering circuit to open said contact means.

4,047,236

SUPERSENSITIVE MAGNETORESISTIVE SENSOR FOR HIGH DENSITY MAGNETIC READ HEAD

Fred S. Lee, Oklahoma City, Okla., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed May 9, 1975, Ser. No. 576,162
Int. Cl.² G11B 5/22
U.S. Cl. 360—113 **1 Claim**



1. A read head for reading high density data recorded as discrete magnetized areas along a track of a magnetic medium, said head comprising:

A. a magnetoresistive sensor strip including at least one open loop, said sensor strip being configured such that the arms of said loop lie completely within the effective field of each discrete magnetized area passing said sensor strip during relative motion between the latter and said magnetic medium, and electrical connecting means coupled to the ends of said sensor strip;

B. wherein the arm of said loops are mutually superposed in parallel alignment with said medium, the dimensions of said arms being defined by a pair of planes substantially normal to said medium and spaced in the direction of relative medium motion;

C. wherein said electrical connecting means include first and second separate parallel core portions each attached to one of said strip ends, the dimensions of said core portions in the direction of medium motion being defined by said plane; and

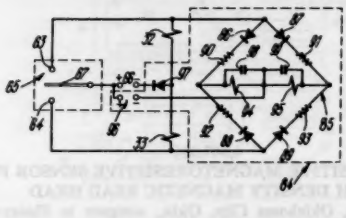
D. wherein said strip is formed as a flattened S-shaped double loop comprising three parallel arms stacked between said planes, the lowest and middle arms each substantially spanning the width of said track in a direction transverse thereto, the highest arm terminating in one of said strip ends connected to said first core portion and substantially dividing said track width with the latter, said first core portion being positioned entirely above said middle arm, said lowest arm terminating in the other end of said strip connected to said second core portion, said second core portion being positioned adjacent said double loop outside said track width.

4,047,237

MEANS FOR CONTROLLING ELECTROMAGNETIC DEVICE HAVING HERMETICALLY SEALED CONTACTS

Vladimir Alexeevich Smirnov, ulitsa Lavochkina, 52, kv. 208, and Vadim Nikolaevich Shoffa, ulitsa Tashkentstaya 15/22, kv. 288, both of Moscow, U.S.S.R.

Division of Ser. No. 505,981, Sept. 13, 1974, Pat. No. 3,952,271.
This application Sept. 29, 1975, Ser. No. 617,574
Int. Cl.[2] H01H *47/36*
U.S. Cl. 361—210 9 Claims



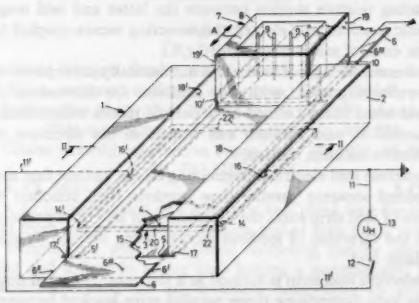
1. An electromagnetic device comprising: a capsule; at least two peripheral elastically mounted magnetically controlled cores; said peripheral magnetically controlled cores being enclosed in said capsule and permanently anchored in its ends; an elastic supporting member arranged in said capsule intermediate of the inner ends of said peripheral magnetically controlled cores; a central elastically mounted magnetically controlled core overlapping said peripheral magnetically controlled cores and rigidly secured in said supporting member; at least one magnetizing coil arranged externally of said capsule; and a power supply connected to said magnetizing coil.

4,047,238

APPARATUS AND PROCESS FOR ELECTROSTATICALLY CHARGING A RECORDING MATERIAL

Roland Moraw, Naurod, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 14, 1976, Ser. No. 695,922
Claims priority, application Germany, June 13, 1975, 2526418
Int. Cl.[2] H01T *19/00*
U.S. Cl. 361—229 22 Claims



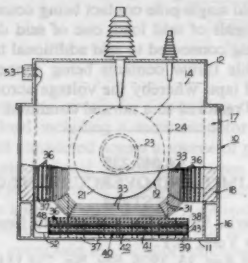
1. An electrostatic charging apparatus, comprising
a. means for producing a corona discharge;
b. a counter-electrode positioned below the discharge means adapted for supporting a recording material to be charged;
c. means for supporting said counter-electrode, including a pair of opposed vertical side walls defining a guide channel of substantially rectangular cross-section along which the recording material can pass; and
d. a pair of elongated strip-like members of electrically insulative material extending within the channel at least from the side walls laterally along the opposed marginal regions of the counter-electrode and longitudinally along the whole length of the counter-electrode.

4,047,239

STATIONARY INDUCTION APPARATUS HAVING MEANS TO MONITOR INSULATION DRYNESS

Michael W. Waterman, Milwaukee, and Samuel L. Foster, Eagle, both of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Division of Ser. No. 521,743, Nov. 7, 1974, Pat. No. 3,961,246.
This application Mar. 12, 1976, Ser. No. 666,475
Int. Cl.[2] G01R *27/26, 31/12*
U.S. Cl. 361—270 6 Claims



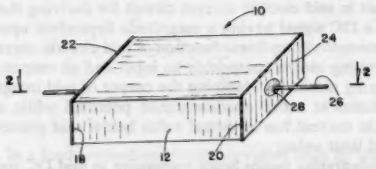
1. A shunt reactor comprising, in combination:
a tank;
insulating oil within said tank;
a shunt reactor coil and yoke assembly including insulation means at the sides and bottom thereof, said coil and yoke assembly being immersed in said oil within said tank;
a pair of electrodes at the bottom of said coil and yoke assembly, said pair of electrodes being spaced apart by at least one layer of insulation which is representative of the insulation utilized with said shunt reactor coil and yoke assembly; and,
a conductor lead connected to each electrode and having their terminal ends exteriorly of said tank.

4,047,240

MULTIPLE ELECTRODE CAPACITOR ASSEMBLY

Victor Insetta, 540 Asharoken Ave., Northport, N.Y. 11768

Filed June 1, 1976, Ser. No. 691,857
Int. Cl.[2] H01G *4/12*
U.S. Cl. 361—275 6 Claims



1. A multiple electrode capacitor assembly for use at very high frequencies comprising:
a monolithic ceramic block;
a pair of conductive electrode plates embedded in said block and disposed in coplanar array, adjacent respective inner ends of said electrodes being spaced apart inside said block; there being no floating electrode electrically coupled to said conductive electrodes; and
conductive terminals in direct electrical contact with respective outer ends of said conductive electrodes, whereby

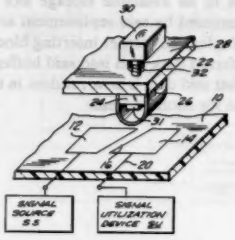
said assembly has low capacitance and high Q, where Q is a figure of merit of said capacitor assembly.

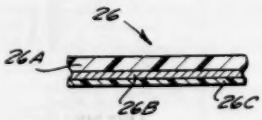
4,047,241

CAPACITIVE SWITCH

Edward H. Lau, Old Westbury, and Francis C. Marino, Dix Hills, both of N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 12, 1976, Ser. No. 676,122
Int. Cl.² H01G 5/01
U.S. Cl. 361—288 **5 Claims**





1. A capacitive switch comprising: an electrical circuit, said circuit having a substrate of insulative material, first and second pads of conductive material on a surface said substrate, each of said pads having a terminal adapted to transfer electrical signals, said pads being separated by a region of the surface of said substrate and having coupling surfaces remote from said substrate; and a capacitive coupling member, said member having a switch stem positioned opposite said pads and said region, said stem including a transverse portion extending so as to span said pads but displaced therefrom, a ribbon of resilient conductive material having ends fixed to respective ends of said transverse portion and having such a length that the ribbon is bowed toward said pads, said ribbon comprising a substrate of resilient plastic material, a layer of metallic material deposited on one surface of said substrate of resilient plastic material, and a coating of insulative material on said layer of metallic material, a buffer layer of elastic material on the face of said transverse portion opposite the bowed portion of said ribbon, and means for guiding said switch for reciprocating movement in the direction of said substrate so that as said switch stem

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4,047,242

COMPACT ELECTRONIC CONTROL AND POWER UNIT STRUCTURE

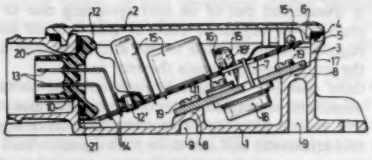
Gert Jakob, Stuttgart, and Siegfried Goetzke, Hemmingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 30, 1976, Ser. No. 682,061
Claims priority, application Germany, July 5, 1975, 2530157
Int. Cl.² H05K 7/20
U.S. Cl. 361—389 **11 Claims**

1. Compact electronic control and power unit structure having

a housing (1) of essentially rectangular cross section, a printed circuit board (11) located in the housing and carrying control elements and electrical conductors having relatively low heat generation, and a power stage (18), having relatively high heat generation, located in the housing;

wherein, in accordance with the invention, said printed circuit board is located essentially diagonally across said substantially rectangular cross section in the housing and



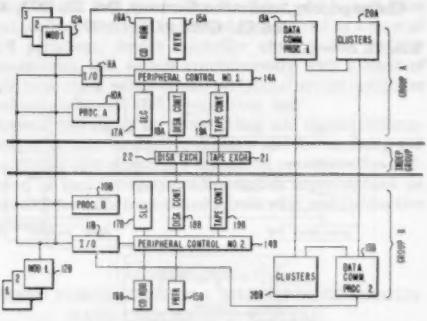
sub-dividing the interior of the space in the housing into two chambers, one chamber having said control elements and electrical conductors having relatively low heat generation located therein and the other chamber having said power stage (18) located therein.

4,047,243

SEGMENT REPLACEMENT MECHANISM FOR VARYING PROGRAM WINDOW SIZES IN A DATA PROCESSING SYSTEM HAVING VIRTUAL MEMORY

Edsger W. Dijkstra, Nuenen (NB), Netherlands, assignor to Burroughs Corporation, Detroit, Mich.

Filed May 27, 1975, Ser. No. 581,161
Int. Cl.² G06F 7/00, 13/00; G11C 9/06
U.S. Cl. 364—200 **1 Claim**



1. A segment replacement mechanism in a data processing system having virtual memory, said system including at least one processor unit, main memory unit, secondary memory and means to transfer information segments from said secondary memory to said main memory unit when such information segments do not reside in said main memory unit at the time of their request, said processor unit including said segment replacement mechanism, an arithmetic unit and a real time counter, said mechanism comprising:

a first plurality of registers coupled together in an order to receive designations of information segments as said segments are transferred from said secondary memory to said main memory unit and to store said designations in the order in which they are most recently received;

circuit means coupled to said first plurality of registers to retrieve a segment designation from one of said first plurality of registers and reenter it at the beginning of said order of said first plurality of registers when the corresponding information segment is requested and resides in said main memory unit, each segment designation before said retrieved segment designation in said order being transferred to the next register in said order of first plurality of registers;

said real time counter providing timing signals representing

the time duration during which said processor unit is processing a process;

a second plurality of registers each coupled to said circuit means and associated with a corresponding one of said first plurality of registers, each of said second plurality of registers being coupled to said real time counter to receive timing signals therefrom each time a segment designation is transferred out of its corresponding one of said first plurality of registers, each of said second plurality of registers being coupled to said arithmetic unit to transmit the stored timing signals thereto; and

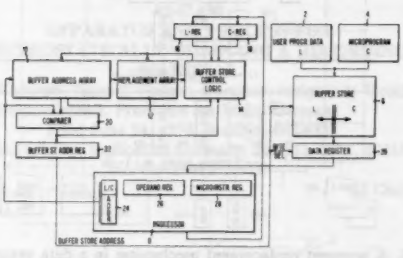
a third plurality of registers each coupled to said circuit means and associated with corresponding ones of said first and second plurality of registers to receive signals from said arithmetic unit and store such signals which represent the average time duration between transfers of segment designations out of the corresponding register of said first plurality of registers as a function of the timing signals supplied to said arithmetic unit by the corresponding one of said second plurality of registers such that the numerical value of the signals stored in said third plurality of registers will approximately increase in an ascending order corresponding to the order of said first plurality of registers.

4,047,244

MICROPROGRAMMED DATA PROCESSING SYSTEM

Karl-Friedrich Finkemeyer, Gaertringen; Kuno M. Roehr, and Guenther Sonntag, both of Boeblingen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 19, 1976, Ser. No. 687,831
Claims priority, application Germany, Oct. 23, 1975, 2547488
Int. Cl.[2] G06F *9/10, 13/00*
U.S. Cl. 364—200 **9 Claims**



1. A microprogrammed data processing system including a processor said system having a first main storage device for storing user data and micro instructions defined as L data and a second main storage device for storing micro instructions defined as C data the improvement comprising:

a. a buffer storage device having data storage space less than either said L information main store and C information main store and commonly connected between each of said main stores and the processor;

b. a buffer address array for storing block addresses of the data available in the buffer store each block address including an L or C indicator dependent on whether the related stored data is L or C data;

c. an address register for receiving address signal representations from said processor of the data item required by said processor, each address signal including a representation of the block of data desired, an associated L/C representation indicating whether the block is L or C data, and area address portions;

d. means responsive to said address register representation for interogating said buffer address array to determine if the block address of data specified in the address register is in the buffer store and for generating a HIT signal if the block address is present or a MISS signal if the matching block address is not present in the buffer array, and also generating a coded block signal representation;

e. buffer store address means responsive to a HIT signal, said area address portions in said address register and said coded block signal representable for reading the corresponding L or C buffer storage data item out to a buffer data register for utilization by said data processor;

f. a replacement array storing indications of the sequence in which data in said buffer array are to be replaced;

g. and control logic responsive to said MISS signal indicating the desired data item is not in said buffer store for transferring the desired data item resident in said L or C main storage to an available storage slot in said buffer store as determined by said replacement array for utilization by said buffer and further inserting block address data of said transferred data item into said buffer address array to indicate that said data is now resident in the buffer store and available for future access.

4,047,245

INDIRECT MEMORY ADDRESSING

Gary L. Knipper, Bolingbrook, Ill., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed July 12, 1976, Ser. No. 704,594
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—200 **3 Claims**

1. In a system for indirectly addressing dedicated locations in a memory **34**, wherein each of said dedicated locations contain a data address signal to another location in said memory, and said system includes a central processing unit (CPU) **12** for interrogating or writing into said memory and for generating indirect address signals comprising most significant bits addressed to said dedicated location and least significant bits not addressed to said dedicated location:

a register means **36** connected to receive and store address signals from said dedicated locations in said memory;

a switchable multiplexer means **30** for switching a normal connection from said CPU to said memory to a connection from said register means to said memory;

a decoder means **50** responsive to the indirect address signal for interrupting operation of said CPU;

a sequencer means **68** actuated by said decoder means ascertaining an indirect address signal for generating a series of successive timing pulses;

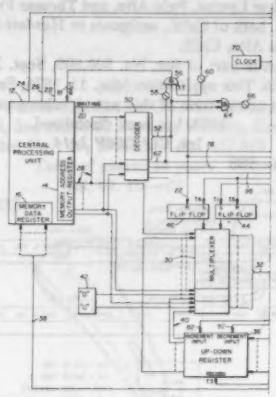
a source of signals **42** rendered effective by a first of said timing pulses T-1 to changing the least significant bits in the indirect address signals applied to said multiplexer means to bits addressed to the dedicated location;

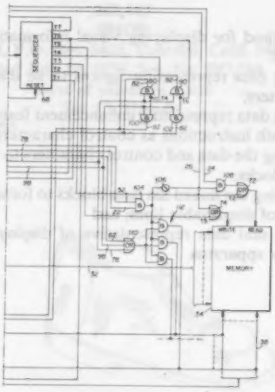
means responsive to the signal now applied by the multiplexer means to the dedicated location in the memory and a second timing pulse T-2 for reading and applying the data address signal in said dedicated location to said register means;

means responsive to a third timing pulse T-3 for triggering the register means to store the data address signal;

means responsive to a subsequent timing pulse T-6 for switching the multiplexer to apply the data address stored in the register means to the memory; and

means responsive to the next subsequent timing pulse T-7 for





reinitiating operation of the CPU to interrogate or write into the memory location at the data address.

4,047,246

I/O BUS TRANSCEIVER FOR A DATA PROCESSING SYSTEM

Natalio Kerllenevich, Lexington, and Daniel Michael Clemson, Weston, both of Mass., assignors to Data General Corporation, Westboro, Mass.

Filed Jan. 10, 1977, Ser. No. 758,110
Int. Cl.[2] G06F *3/04*; H04L *5/14*
U.S. Cl. 364—200 **1 Claim**

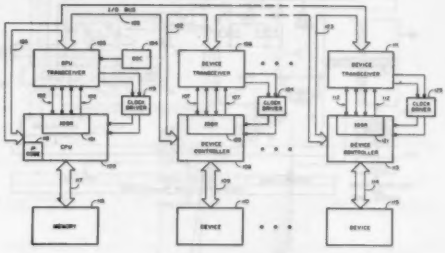
1. In a data processing system including a CPU and at least one peripheral device controller, transceiver means including a CPU transceiver and at least one peripheral device controller transceiver for transmitting and receiving signals between said CPU and said peripheral device controller, said transceiver means comprising:

means for developing local clock pulses of predetermined frequency in said CPU transceiver and said peripheral device controller transceiver, the local clock pulses of said peripheral device controller transceiver being phase shifted from the local clock pulses of said CPU transceiver as a function of conductive distance therebetween;

first deriving means responsive to said developing means for deriving CPU clock pulses of less than said predetermined frequency from said local clock puleses of said CPU transceiver and for conducting said CPU clock pulses to said CPU;

second deriving means responsive to said developing means for deriving peripheral device controller clock pulses of said less than said predetermined frequency from said local clock pulses of said peripheral device controller transceiver and for conducting said peripheral device controller clock pulses to said peripheral device controller;

first means for receiving said signals from said CPU synchronized by a burst of said CPU clock pulses and for transmitting said signals synchronously with a burst of said local clock pulses of said CPU transceiver to said peripheral device controller transceiver;



second means, operative mutually exclusively with the operation of said first means, for receiving said signals from said peripheral device controller sychronized by a burst of said peripheral device controller clock pulses and for transmitting said signals synchronously with a burst of said local clock pulses of said peripheral device controller transceiver to said CPU transceiver; and

differential bus means for transmitting said signals differentially over said conductive distance and for receiving and combining said signals in a manner to provide self-cancellation of any extraneous noise signals superimposed on said differentially transmitted signals over said conductive distance.

4,047,247

ADDRESS FORMATION IN A MICROPROGRAMMED DATA PROCESSING SYSTEM

Philip E. Stanley, Westboro; William E. Woods, Natick, and Kenneth J. Izbicki, Hudson, all of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Apr. 7, 1976, Ser. No. 674,517
Int. Cl.[2] G06F *9/20*
U.S. Cl. 364—200 **3 Claims**

1. A data processing system comprising:

A. an instruction register for storing an instruction word for indicating both a code of an operation to be performed in said system and an address indicator for pointing to a control word which is to provide control signals for effecting said operation indicated by said code;

B. a control storage device having a plurality of said control words stored therein, each of said control words including a plurality of fields, said fields providing said control signals for controlling the operation of said system, one of said fields for indicating an address of the next location to be addressed dependent upon a specified test result;

C. a memory device having a plurality of locations, each location for storing a word, some of said words including an operand;

D. a base register for use primarily in storing a base address of a said location in said memory device;

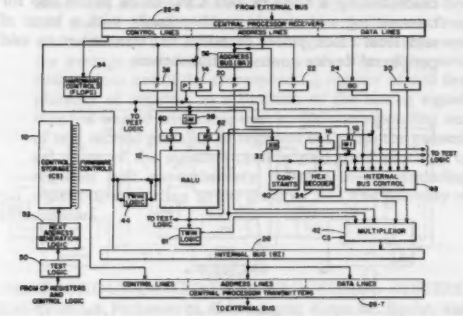
E. an index register for storing an index value for use with said base address in computing a final effective address of

a said location in said memory device, said index value equal to zero if there is no such indexing required;

F. a data register;

G. means, responsive to the contents of said base register and said index register, for reading said operand from said memory device and writing said operand into said data register;

H. means for transferring the contents of said data register



into said instruction register so as to modify the code of operation; and

I. control store device addressing logic, responsive to said address indicator in said instruction word in said instruction register and said field for indicating a next location address from a most recently addressed one of said control words, for generating said next location address of a location in said control storage device.

4,047,248

LINKED LIST DATA ENCODING METHOD AND CONTROL APPARATUS FOR A VISUAL DISPLAY

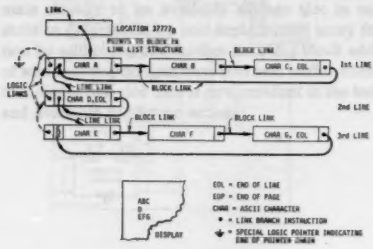
Richard Ricker Lyman, Palo Alto, and Thomas Frank Waltman, Cupertino, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 508,600, Sept. 23, 1974, Pat. No. 3,972,026. This application Mar. 11, 1976, Ser. No. 665,829

The portion of the term of this patent subsequent to July 27, 1993, has been disclaimed.

Int. Cl.[2] G06F *3/14*

U.S. Cl. 364—900 **54 Claims**



1. A method for displaying visual information comprising the steps of:

encoding data representing figures to be displayed as data characters;

encoding data representing enhancement features and execution path instructions as control characters;

combining the data and control characters to form linked list data blocks;

interpreting the linked list data blocks to form data representative of displayable lines; and

applying said data representative of displayable lines to a display apparatus.

DESIGNS

SEPTEMBER 6, 1977

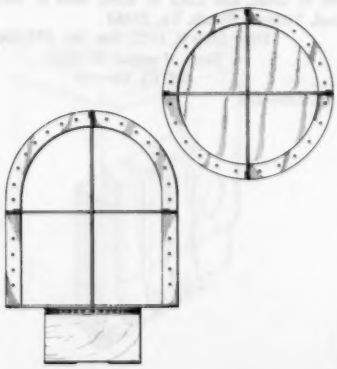
245,646
HELMET FACE SHIELD MOUNTING BRACKET
Elvert H. Land, Jr., 16205 E. Pawnee, Wichita, Kans. 67230
Filed Nov. 19, 1975, Ser. No. 633,568
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

245,647
SHOE
David W. Gadd, P.O. Box 5403, Concord, Calif. 94524
Filed July 18, 1975, Ser. No. 597,244
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—275

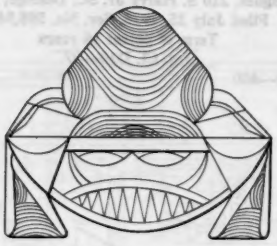
245,648
BOOT JACK
Harold L. Taylor, 1255 Dodgin Lane, Fallon, Nev. 89406
Filed Mar. 1, 1976, Ser. No. 662,572
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D2—378.2

245,649
CLIP ON POCKET
Jerry G. Hughes, 210 S. Harry Jr. St., Desloge, Mo. 63601
Filed July 25, 1975, Ser. No. 598,944
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D2—400

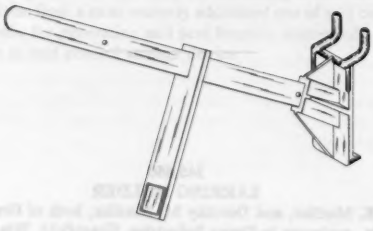
245,650
EARRING HOLDER
Ray E. Mueller, and Dorothy M. Mueller, both of Greenfield, Wis., assignors to Doray Industries, Greenfield, Wis.
Filed Nov. 18, 1975, Ser. No. 633,080
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—23



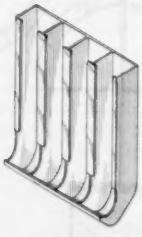
245,651
SEA MONSTER CHAIR
Ramon Rivera Albert, c/o George Spector, 3615 Woolworth Building, 233 Broadway, New York, N.Y. 10007
Filed Nov. 11, 1975, Ser. No. 630,813
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—68



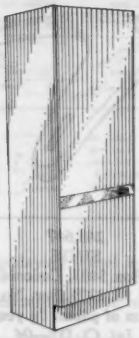
245,652
DISPLAY BRACKET TO BE USED WITH PERFORATED SUPPORTS OR THE LIKE
Donald T. Crysdale, 2800 E. Edgewood Ave., Shorewood, Wis. 53211
Filed Nov. 28, 1975, Ser. No. 636,081
Term of patent 14 years
Int. Cl. D20—*02;* D8—*08*
U.S. Cl. D6—114



245,653
COMBINED STORAGE AND DISPENSING RACK OR THE LIKE
Lowell R. Kent, and Lucy E. Kent, both of 1082 Tradewinds Road, Virginia Beach, Va. 23462
Filed May 8, 1975, Ser. No. 575,806
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—130

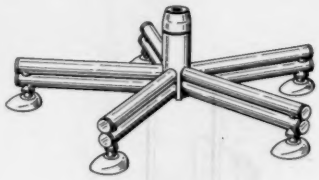


245,654
KITCHEN CABINET
George Henry Robinson, Liverpool, England, assignor to Hygena Limited, Liverpool, England
Filed Oct. 10, 1975, Ser. No. 621,348
Claims priority, application United Kingdom, Apr. 14, 1975, 970695/75
Term of patent 3½ years
Int. Cl. D6—*04*
U.S. Cl. D6—167



245,655
PANELING FOR A KITCHEN CABINET OR SIMILAR ARTICLE
Horst Friedrich, Bad Kreuznach, Germany, assignor to Milewski Moebelwerk Zeil KG, Zeil, Main, Germany
Filed June 9, 1975, Ser. No. 585,279
Claims priority, application Germany, Dec. 10, 1974, 671676
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—192

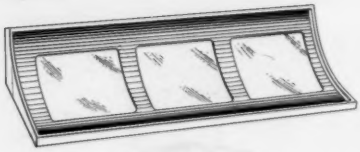
245,656
BASE FOR A CHAIR
Gregory S. Gabourie, Ajax, Canada, assignor to Global Upholstery Company Limited
Filed Mar. 23, 1976, Ser. No. 669,502
Claims priority, application Canada, Sept. 30, 1975, 3009751
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—196



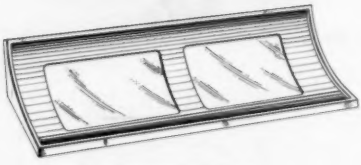
245,657
SLING CHAIR BODY
Gerry D. Welton, 910 E. Tripp, Peoria, Ill. 61603
Continuation-in-part of Ser. No. 162,759, July 14, 1971, Pat. No. D 226,794. This application May 1, 1973, Ser. No. 356,108
The portion of the term of this patent subsequent to May 1, 1987, has been disclaimed.
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—197

245,658
PICTURE FRAME OR THE LIKE
Gerald M. Grusin, Chicago, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Nov. 12, 1975, Ser. No. 631,002
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—235

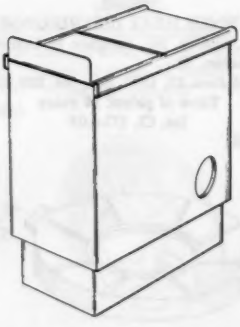
245,659
PICTURE FRAME OR THE LIKE
Gerald M. Grusin, Chicago, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Nov. 12, 1975, Ser. No. 631,003
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—284



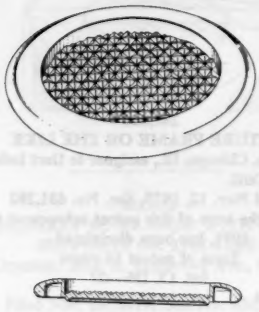
245,660
PICTURE FRAME OR THE LIKE
Gerald M. Grusin, Chicago, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Nov. 12, 1975, Ser. No. 631,292
The portion of the term of this patent subsequent to Sept. 6, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234



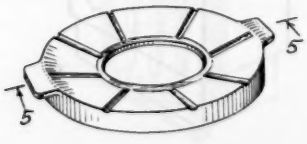
245,661
CHEESE-SLICER
Martin Gustav Dackeryd, Vastergatan 23, Hoor, Sweden S-24300
Filed Sept. 18, 1975, Ser. No. 614,666
Claims priority, application Sweden, Mar. 21, 1975, 619/75
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—43



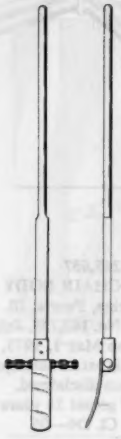
245,662
COASTER
John L. Hall, 1491 Mar Vista Ave., Pasadena, Calif. 91104
Filed Dec. 8, 1975, Ser. No. 638,335
Term of patent 14 years
Int. Cl. D7—06
U.S. Cl. D7—45



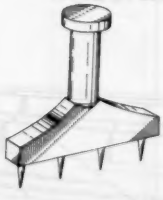
245,663
BURNER HEAT DISTRIBUTOR
Norman Gordon, Skokie, Ill., assignor to Consumer Products Industries, Chicago, Ill.
Filed June 23, 1975, Ser. No. 589,252
Term of patent 14 years
Int. Cl. D7—04
U.S. Cl. D7—136



245,664
DIGGING TOOL
Brooks H. Holcombe, 10319 State, Rte. 5 NE., Kinsman, Ohio 44428
Filed July 10, 1975, Ser. No. 594,769
Term of patent 14 years
Int. Cl. D8—01
U.S. Cl. D8—10



245,665
CARPET TOOL
William J. Klingensmith, 3148 Mogadore Road, Akron, Ohio 44312
Filed June 14, 1976, Ser. No. 695,859
Term of patent 14 years
Int. Cl. D8—05
U.S. Cl. D8—15

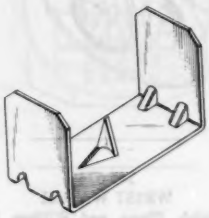


245,666

CAN PUNCTURING TOOL OR SIMILAR ARTICLE

James Stewart Calkins, and Alfred Nilsen, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 15, 1975, Ser. No. 605,115
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—18

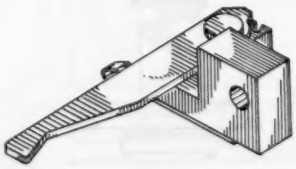


245,667

WIRE CUTTER

Edward C. Malholt, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 24, 1976, Ser. No. 689,320
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—52

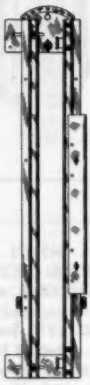


245,668

ADJUSTABLE JIG FOR PORTABLE POWER SAWS, ROUTERS AND THE LIKE

Frank N. Bretthauer, Putnam Valley, N.Y., assignor to Brett-Hauer Co., Inc., Putnam Valley, N.Y.

Filed May 14, 1976, Ser. No. 686,329
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—71

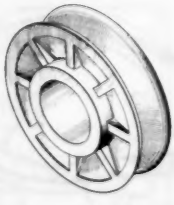


245,669

PULLEY

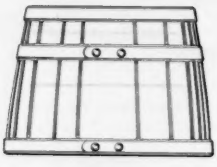
Robert L. Woods, 1033 Norton St., Mesquite, Tex. 75149

Filed Jan. 19, 1976, Ser. No. 650,128
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D8—360



245,670
VITAMIN DISPENSER
William M. Clover, Jr., Costa Mesa, Calif., assignor to Kirstine/Hendricks, Irvine, Calif.
Filed June 23, 1976, Ser. No. 698,991
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

245,671
BOTTLE CLOSURE
Gordon A. Strand, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Mar. 23, 1976, Ser. No. 669,786
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—269

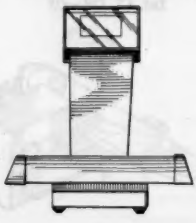


245,672
PAINT CAN ACCESSORY
John P. Grantham, 9645 Mentor Road, Chardon, Ohio 44024
Filed June 20, 1975, Ser. No. 588,776
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—289

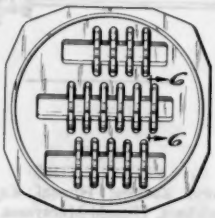
245,673
CLOCK
Shirley Ann Bartlett, 717 Park Drive, Hillsboro, Tex. 76645
Filed Mar. 17, 1975, Ser. No. 558,771
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—7

245,674
WRIST WATCH
Eugene Joseph Sulek, Plano, and William James Lawrence, Dallas, both of Tex., assignors to Texas Instruments Inc., Dallas, Tex.
Filed Jan. 26, 1976, Ser. No. 652,699
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

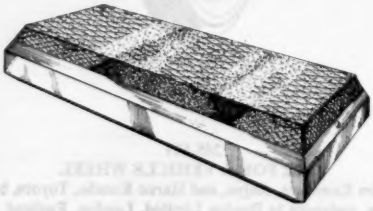
245,675
WEIGHING SCALE
Walter P. Kushmuk, Niles, Ill., assignor to Continental Scale Corporation, Bridgeview, Ill.
Filed Aug. 18, 1975, Ser. No. 605,237
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91



245,676
FLIGHT INFORMATION INDICATOR FOR AIRCRAFT
Stephen F. Jakobowski, P.O. Box 5714, Pompano Beach, Fla. 33064
Filed Mar. 1, 1976, Ser. No. 662,718
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—67



245,677
INTRUSION DETECTOR
Kenneth R. Hackett, Boulder, Colo., assignor to Sontrix Division of Pittway Corporation, Boulder, Colo.
Filed Mar. 25, 1976, Ser. No. 670,276
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106

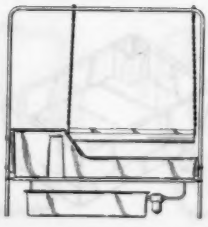


245,678
AUTOMOBILE SAFETY SIGNAL
John V. Medeiros, 89 Norwood St., Swansea, Mass. 02777
Filed June 21, 1976, Ser. No. 698,766
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—109

245,679
CROSS
Rodney Keith Parkison, 5816 Australian Pine Drive, Tamarac, Fla. 33319
Filed Jan. 26, 1976, Ser. No. 652,164
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D11—81

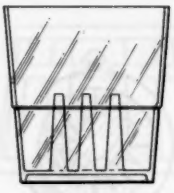
245,680
CHARM
William S. Klitzner, 400 Narragansett Parkway, Warwick, R.I. 02888
Filed Jan. 19, 1976, Ser. No. 650,932
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—83

245,681
HYDROPONIC GROWING SYSTEM
Ted L. Farner, 714 W. McCord St., Neosho, Mo. 64850
Filed Dec. 19, 1975, Ser. No. 642,465
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—144

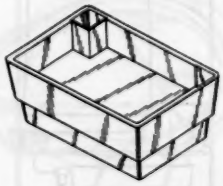


245,682
AVOCADO SEED STARTER CUP
Richard R. Thomas, 773 Heflin St., Milpitas, Calif. 95035
Filed Dec. 15, 1975, Ser. No. 640,463
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152

245,683
AVOCADO SEED STARTER CUP
Richard R. Thomas, 773 Heflin St., Milpitas, Calif. 95035
Filed Dec. 15, 1975, Ser. No. 640,464
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152



245,684
TRAY FOR HYDROPONIC GARDENING
Helmut D. Julinot, 3455 Havenwood Avenue, House 30, Mississauga, Canada
Filed Feb. 6, 1976, Ser. No. 655,761
Claims priority, application Canada, Aug. 13, 1975, 130875
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—155

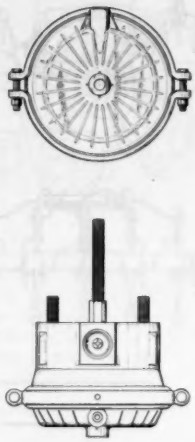


245,685
LIVE POULTRY MOVER
Gary L. Squier, Gaylord, Minn. 55334
Filed Sept. 23, 1974, Ser. No. 508,192
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—58

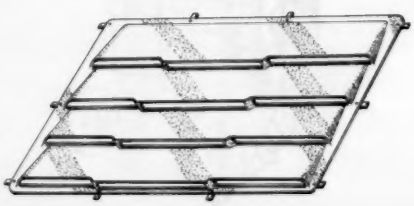
245,686
VEHICLE TIRE
Toshio Hakayawa, Kodaira; Hiroshi Kojima, Hino, and Masafumi Yoshihara, Higashi-Murayama, all of Japan, assignors to Bridgestone Tire Company Limited, Kyobashi, Japan
Filed Jan. 7, 1976, Ser. No. 647,198
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143

245,687
TIRE FOR A VEHICLE WHEEL
Masahiro Kawabata, Anjyo, and Haruo Kusube, Toyota, both of Japan, assignors to Dunlop Limited, London, England
Filed May 19, 1975, Ser. No. 578,936
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—136

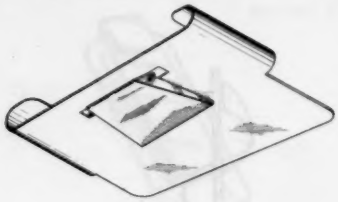
245,688
AIR BRAKE
Edward H. Clapp, 4117 Druid Hills, Dallas, Tex. 75224
Filed Apr. 19, 1976, Ser. No. 678,176
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—179



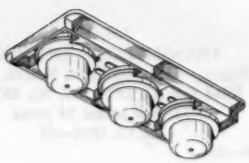
245,689
PASSENGER CAR WINDOW SUN LOUVER
Elwood J. Simpson, Rancho Palos Verdes, Calif., assignor to Cragar Industries
Filed Apr. 28, 1976, Ser. No. 681,339
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—181



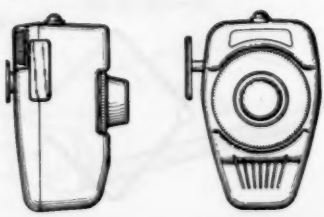
245,690
COMBINED AUXILIARY VISOR AND CLIP
Anton Tony Egersdorf, 3835 McGuire St., Meridian, Idaho 83642
Filed Apr. 12, 1976, Ser. No. 657,779
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—191



245,691
STORAGE BATTERY GANG VENT CAP
Philip White, Toronto, Canada, assignor to Varta Batteries Ltd., Canada
Filed Apr. 7, 1976, Ser. No. 674,567
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—10

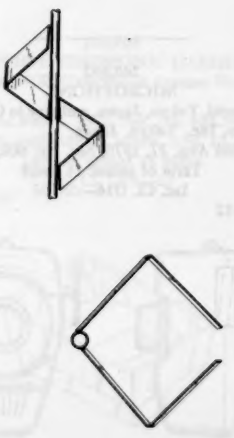


245,692
MICROPHONE
Kazuyoshi Imazeki, Tokyo, Japan, assignor to General Research of Electronics, Inc., Tokyo, Japan
Filed Aug. 27, 1975, Ser. No. 608,021
Term of patent 14 years
Int. Cl. D14—*03, 01*
U.S. Cl. D14—12

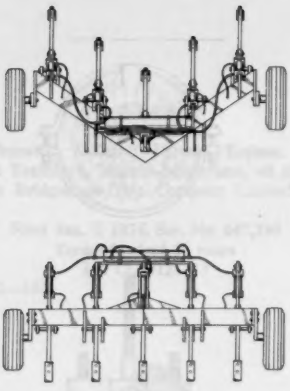


245,693
TRANSMITTING ANTENNA
Richard D. Bogner, 4 Hunters Lane, Roslyn, N.Y. 11576
Filed Feb. 12, 1976, Ser. No. 657,575
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

245,694
TRANSMITTING ANTENNA
Richard D. Bogner, 4 Hunters Lane, Roslyn, N.Y. 11576
Filed Feb. 12, 1976, Ser. No. 657,581
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

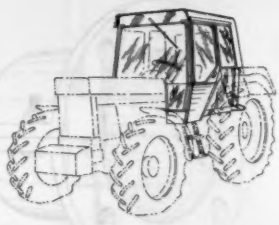


245,695
HYDRAULIC RESET GROUND RIPPER IMPLEMENT
Clifford V. Watts, McMinnville, Oreg., assignor to Watts Plow Company of Oregon, Inc., McMinnville, Oreg.
Filed Aug. 18, 1976, Ser. No. 715,438
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—11

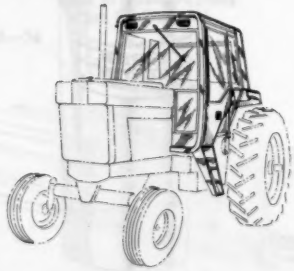


245,696
GROUND RIPPER TOOTH
Clifford V. Watts, McMinnville, Oreg., assignor to Watts Plow Company of Oregon, Inc., McMinnville, Oreg.
Filed Aug. 18, 1976, Ser. No. 715,437
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

245,697
TRACTOR CAB
Robert A. Skyer, Palatine, and George E. Bowman, Country Club Hills, both of Ill., assignors to International Harvester Company
Filed May 20, 1976, Ser. No. 688,433
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—30

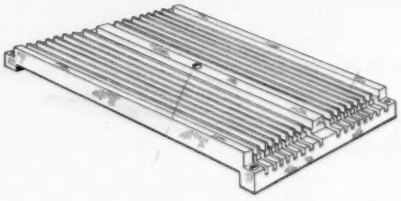


245,698
CAB
Robert A. Skyer, Palatine, and George E. Bowman, Country Club Hills, both of Ill., assignors to International Harvester Company
Continuation-in-part of Ser. No. 610,704, Sept. 5, 1975, abandoned. This application Aug. 23, 1976, Ser. No. 716,739
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—30

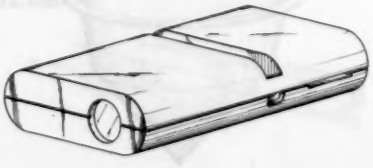


245,699
ICE TRAY COVER
Frank H. Lewis, 222 E. 93rd St., New York, N.Y. 10028
Filed July 13, 1976, Ser. No. 704,847
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—90

245,700
TRAY FOR QUARTZ CRYSTALS
Stephen Ozimec, 33391 Padina Circle, Laguna Niguel, Calif. 92677
Filed July 2, 1976, Ser. No. 702,277
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—140

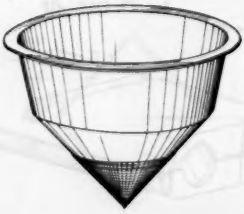


245,701
KALEIDOSCOPIC PROJECTOR
William C. Kinsinger, New York, N.Y., assignor to Qantix Corporation, Flemington, N.J.
Filed Feb. 11, 1976, Ser. No. 657,067
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—20

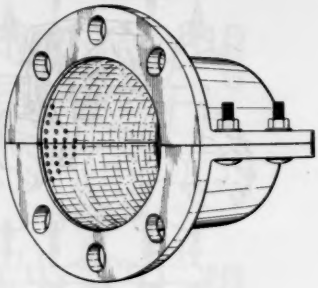


245,702
NOTE PAD HOLDER FOR A TELEPHONE OR THE LIKE
Andrew John Carpenter, Wembly, England, assignor to Darpex Manufacturing Company Limited, London, England
Filed Sept. 5, 1975, Ser. No. 610,528
Claims priority, application United Kingdom, Mar. 11, 1975, 970252
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—86

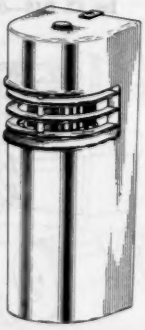
245,703
COMBINED MIXING AND FILTER BOWL
William Felix Hughes, Perth, Australia, assignor to Hughes Steel Products Pty. Ltd., Australia
Filed Sept. 30, 1975, Ser. No. 618,195
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4



245,704
HOSE COUPLING
Sven-Erik Dyrup, Oxie, Sweden, assignor to Trelleborgs Gummifabriks AB
Filed July 26, 1973, Ser. No. 382,987
Claims priority, application Sweden, Jan. 29, 1973, 193/73
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—44

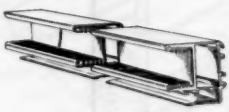


245,705
FRAGRANCE-EMITTER HOUSING
Rokuro Fukada, Ohtsu, Japan, assignor to Elkosha Co., Ltd., Kyoto, Japan
Filed June 10, 1976, Ser. No. 694,558
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

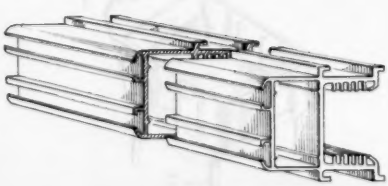


245,706
MOVIE VIEWING BOOTH
Wayne D. McAllister, 695 Busch Gardea Drive, Pasadena, Calif. 91105
Filed Sept. 8, 1975, Ser. No. 611,512
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—16

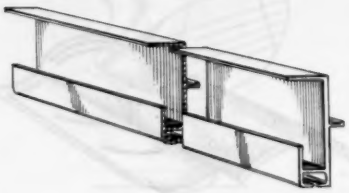
245,707
WINDOW COMPONENT EXTRUSION
Raymond Dallaire, P.O. Box 220, Levis, Quebec, Canada
Filed Apr. 5, 1976, Ser. No. 673,433
Claims priority, application Canada, Oct. 10, 1975, 10-10-75-5
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



245,708
WINDOW COMPONENT EXTRUSION
Raymond Dallaire, P.O. Box 220, Levis, Quebec, Canada
Filed Apr. 5, 1976, Ser. No. 673,434
Claims priority, application Canada, Oct. 10, 1975, 10-10-75-2
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

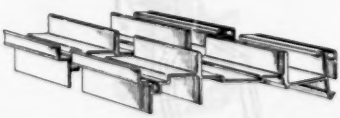


245,709
WINDOW COMPONENT EXTRUSION
Raymond Dallaire, P.O. Box 220, Levis, Quebec, Canada
Filed Apr. 5, 1976, Ser. No. 673,435
Claims priority, application Canada, Oct. 10, 1975, 10-10-75-4
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



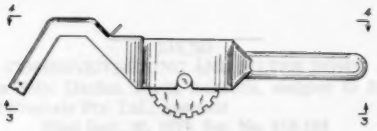
245,710
WINDOW COMPONENT EXTRUSION
Raymond Dallaire, P.O. Box 220, Levis, Quebec, Canada
Filed Apr. 5, 1976, Ser. No. 673,436
Claims priority, application Canada, Oct. 10, 1975, 10-10-75-3
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

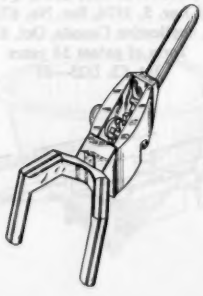
245,711
WINDOW COMPONENT EXTRUSION
Raymond Dallaire, P.O. Box 220, Levis, Quebec, Canada
Filed Apr. 5, 1976, Ser. No. 673,437
Claims priority, application Canada, Oct. 10, 1975, 10-10-75-1
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



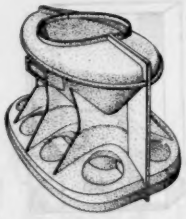
245,712
ROOFING TILE
John G. Wotherspoon, Anaheim, Calif., assignor to Martin E. Gerry, Santa Ana, Calif., a part interest
Continuation-in-part of Ser. No. 612,020, Sept. 10, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,492
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80

245,713
DENTAL FLOSS APPLICATOR
Wayne B. Jennings, 114 Cloverleaf Drive, Athens, Ala. 35611
Filed Dec. 10, 1976, Ser. No. 749,214
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64

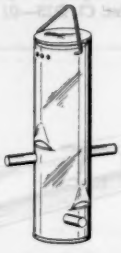




245,714
ANIMAL FEEDER
Julius C. Becker, Downs, Kans., assignor to Becker Manufacturing Company, Incorporated, Downs, Kans.
Filed Aug. 18, 1976, Ser. No. 715,446
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—13

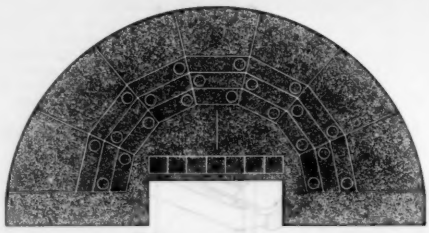


245,715
BIRD FEEDER
Thomas M. Eldridge, Jr., 2571 Dellwood Drive, NW., Atlanta, Ga. 30305
Filed Aug. 23, 1976, Ser. No. 716,695
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—14

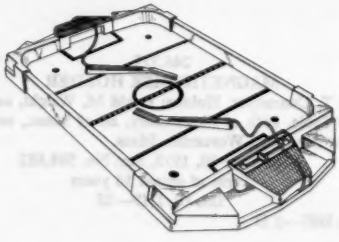


245,716
CAR SEAT FOR A DOMESTIC ANIMAL
Anthony J. Russo, 144 Bentwillow Drive, Niles, Ohio 44446
Filed Sept. 8, 1975, Ser. No. 611,403
Term of patent 14 years
Int. Cl. D30—*06*
U.S. Cl. D30—41

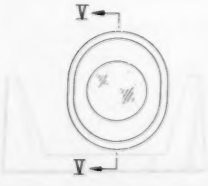
245,717
GAME BOARD
John David Jessie, 4385 Sunnyview Court, Las Vegas, Nev. 89117
Filed Dec. 17, 1974, Ser. No. 533,698
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



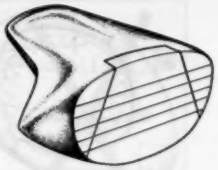
245,718
HOCKEY GAME BOARD
William J. Maloney, II, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Dec. 29, 1975, Ser. No. 644,428
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



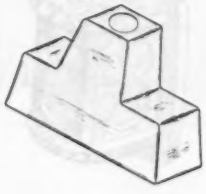
245,719
PIECE FOR GAME
Satoshi Hasegawa, 6-506 Keyakidai-danchi, 1-13-2 Wakaba-cho, Tachikawa, Tokyo, Japan
Filed Jan. 26, 1976, Ser. No. 652,082
Claims priority, application Japan, Aug. 7, 1975, 50-32283
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP



245,720
GOLF CLUB HEAD OR SIMILAR ARTICLE
Eli Romero, R.R. No. 1, Goddard, Kans. 67052
Filed Mar. 8, 1976, Ser. No. 664,813
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

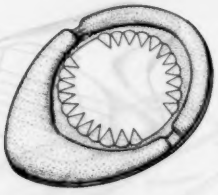


245,721
GOLF CLUB HEAD
Bernard C. Koch, 2107 Brandywood Drive, Wilmington, Del. 19810
Filed Mar. 15, 1976, Ser. No. 666,964
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

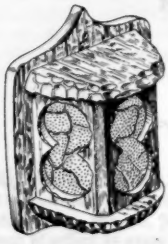


245,722
TOY SKUNK
Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44266
Filed May 26, 1976, Ser. No. 690,092
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

245,723
FLOAT TOY FOR WATER ASSOCIATED RECREATIONAL ACTIVITIES
Garry Rumbaugh, 621 Hillen Road, Towson, Md. 21204
Filed Dec. 22, 1975, Ser. No. 642,715
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—41

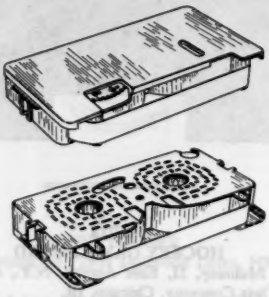


245,724
LIGHT FIXTURE
Dave E. Schemenauer, Three Rivers, Mich., assignor to Accessories by Sherwood, Elkhart, Ind.
Filed July 22, 1976, Ser. No. 707,879
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—4 B

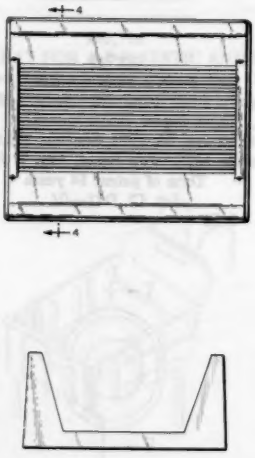


245,725
BANJO RESONATOR FLANGE
Geoffrey H. Stelling, 8815 Kenwood Drive, Spring Valley, Calif. 92077
Filed Dec. 29, 1975, Ser. No. 644,940
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

245,726
CARBON RIBBON CARTRIDGE
Ettore Sottsass, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy
Filed Nov. 26, 1975, Ser. No. 635,631
Claims priority, application Italy, June 9, 1975, 53158/75
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D64—11 A



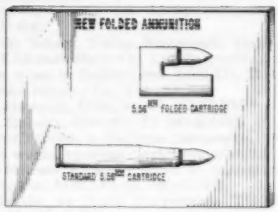
245,727
MAGNETIC DISK HOLDER
Bernard T. Cournoyer, Holden; David M. Wright, and Jerome M. O'Toole, both of Shrewsbury, all of Mass., assignors to Wright Line Inc., Worcester, Mass.
Filed June 20, 1975, Ser. No. 588,682
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D87—1 D

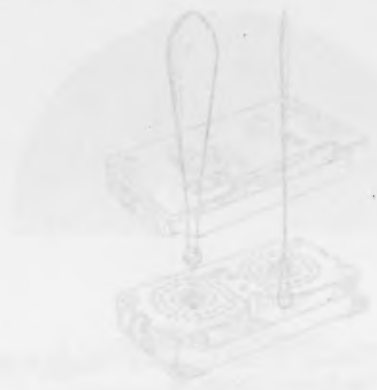


245,728
POCKET INSERTABLE TOWEL CARRIER
Elbert O. Rials, 3603 Oakhurst Drive, Midwest City, Okla. 73110
Filed Dec. 19, 1975, Ser. No. 642,498
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1 R

245,729
SYMBOLIC NO-SMOKING SIGN
Thomas L. Gripe, 2719 El Rancho, Wichita, Kans. 67216
Filed Apr. 14, 1975, Ser. No. 567,684
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 E

245,730
ADVERTISING PLAQUE
Andrew J. Grandy, 2707 Grant Ave., North Hills, Pa. 19038
Filed Sept. 22, 1975, Ser. No. 615,498
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 E





LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF SEPTEMBER, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.M. Liaaen A/S: *See*—
Liaaen, Anders Marius, 4,046,096, Cl. 115-35.000.

A. Monforts: *See*—
van Wersch, Kurt, 4,046,942, Cl. 428-255.000.

Aanstad, Ola J.: *See*—
Heiser, Richard S.; and Aanstad, Ola J., 4,047,005, Cl. 235-151.210.

AB ID-Kort: *See*—
Malmberg, Thor Anders Helge; Hogberg, Knut Goran; and Sjoquist, Stig Roland, 4,047,033, Cl. 250-341.000.

Abbott Laboratories: *See*—
Paris, Gerard Yvon; and Cimon, Denis Gaston, 4,046,887, Cl. 424-232.000.
Warawa, Edward John, 4,046,892, Cl. 424-248.570.

Abbott, Phillip Andrew. Apparatus and method of assisting pile driving by electro-osmosis. 4,046,657, Cl. 204-180.00R.

Abe, Hiroaki: *See*—
Ishino, Ken; Hashimoto, Yasuo; and Abe, Hiroaki, 4,046,983, Cl. 219-10.55D.

Abe, Mitsunobu: *See*—
Takechi, Hiroshi; Abe, Mitsunobu; Usuda, Matsuo; and Komiya, Kunihiko, 4,046,597, Cl. 148-12.00R.

Abrahams, Jacobus Hubertus; Collette, Joannes Jacobus Maria; and Walters, Robertus Aloysius Tarcisius Johannes, to U.S. Philips Corporation. Hot-gas reciprocating machine. 4,045,978, Cl. 60-521.000.

Ackeret, Peter, to IDN Inventions and Development of Novelties AG. Container for standard magnetic tape cassette. 4,046,255, Cl. 206-387.000.

Acorn Engineering Company: *See*—
Morris, Earl L.; and Fields, Larry D., 4,045,827, Cl. 4-3.000.

Acushnet Company: *See*—
Porter, Raymond P., 4,045,838, Cl. 15-250.360.

Adahan, Carmeli, to Aspro, Inc. Brake pressure modulator and system. 4,046,214, Cl. 180-109.000.

Adams, Derek William: *See*—
Smith, Kenneth Browning; and Adams, Derek William, 4,047,036, Cl. 250-359.000.

Addor, Roger William: *See*—
Kameswaran, Venkataraman; and Addor, Roger William, 4,046,799, Cl. 260-465.00D.

Addressograph Multigraph Corporation: *See*—
Booth, Thomas Allan; and Scholten, Frank Lynn, 4,046,475, Cl. 355-69.000.
Masiello, Felix R., 4,047,188, Cl. 354-15.000.
Miller, Norman Carlile, 4,046,565, Cl. 96-1.50R.

Adelaar, Hans Helmut, to International Standard Electric Corporation. Times slot switching. 4,046,963, Cl. 179-15.00A.

Adelmann, Siegfried; Margotte, Dieter; Merten, Josef; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Polycarbonate molding materials. 4,046,836, Cl. 260-860.000.

Adler, Franklin P., to Pullman Incorporated. Hopper door actuating mechanism. 4,046,268, Cl. 214-58.000.

Adlon, Bruce E.; Villiers, Walter H.; and Tarnoff, Sherwin S., to General Electric Company. X-ray film storage and viewing device. 4,045,896, Cl. 40-106.100.

Aerodyne Development Corporation: *See*—
Phillippi, John F., 4,046,526, Cl. 55-96.000.

Aerpat A.G.: *See*—
Alvi, Zia Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, 4,046,053, Cl. 85-72.000.

Aetna Bearing Company: *See*—
Brown, Villy, 4,046,436, Cl. 308-233.000.

AGA Aktiebolag: *See*—
Teiling, Carl Torbern, 4,047,087, Cl. 318-661.000.

Agency of Industrial Science & Technology: *See*—
Kataoka, Shoei; Komaniya, Yasuo; Hashizume, Nobuo; Tomizawa, Kazutaka; and Kawashima, Mitsuo, 4,047,199, Cl. 357-3.000.
Suzuki, Yoshikazu, 4,045,857, Cl. 29-420.000.
Takaoka, Sabro; Shinoda, Akira; and Kobayashi, Hideo, 4,046,204, Cl. 175-76.000.
Tarui, Yasuo; Sakamoto, Tsunenori; and Komiya, Yoshio, 4,046,594, Cl. 136-89.0SJ.

AGFA-Gevaert, Aktiengesellschaft: *See*—
Boie, Immo; and Lowski, Dieter, 4,046,575, Cl. 96-100.00N.
Odenwalder, Heinrich; Ranz, Erwin; Puschel, Walter; and Vetter, Hans, 4,046,574, Cl. 96-99.000.
Zahn, Wolfgang; Zangenfeind, Helmut; and Domges, Gunther, 4,046,614, Cl. 156-353.000.

AGFA-GEVAERT N.V.: *See*—
Fierens, Marcel Robert; and Heylen, Renaat Frans, 4,046,570, Cl. 96-61.00R.
Stievenart, Emile Frans; Plessers, Hendrik Sylvester; Neujens, Georges Jozef; and Van Bouwel, Leo Pa ul, 4,047,193, Cl. 354-105.000.

Agnew, S. J.: *See*—
Jones, Allen Jacob, 4,045,924, Cl. 52-125.000.

Ahlstrom, Allan. Vending machine operated by a check ticket to record use thereon. 4,046,242, Cl. 194-4.00R.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Thyristor switching circuit. 4,047,054, Cl. 307-252.00J.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Monostable switching circuit. 4,047,057, Cl. 307-273.000.

Aikoh Co., Ltd.: *See*—
Matsuyama, Shigeru; and Mikami, Hiroshi, 4,046,187, Cl. 164-53.000.

Airco, Inc.: *See*—
Cormia, Robert L.; Trumbly, Terry A.; and Andresen, Sigurd, 4,046,659, Cl. 204-192.00C.

Aizawa, Hiroshi: *See*—
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, 4,047,194, Cl. 354-149.000.

Ajax Hardware Corporation: *See*—
Gorton, Howard Byron; and Lyons, Richard B., 4,045,982, Cl. 70-90.000.

Ajax Magnethermic Corporation: *See*—
Bendzsak, Gabor J., 4,047,092, Cl. 363-135.000.

Ajdukovic, Djordje: *See*—
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Mackay, Angus Campbell, 4,046,811, Cl. 260-578.000.

Akahane, Fumitake: *See*—
Kobayakawa, Masaki; and Akahane, Fumitake, 4,047,066, Cl. 313-217.000.

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Albert Obrist & Co.: *See*—
Ruch, Heinz, 4,046,282, Cl. 220-270.000.

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Innes, Robert Arthur; Enright, Gregory Preston Michael; and Derrick, Garnet Lloyd, 4,046,931, Cl. 427-428.000.

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Stenstrom, Lennart Arvid, 4,046,208, Cl. 177-19.000.

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Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,088, Cl. 112-265.000.
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Allied Chemical Corporation: *See*—
Armor, John N.; and Pez, Guido P., 4,046,790, Cl. 260-429.500.
Seeling, Philip F.; and Bean, Samuel L., 4,046,867, Cl. 423-543.000.
Wheeler, Walter Morris; and Ocker, Klaus Frederick, 4,046,332, Cl. 242-107.40A.
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Shaw, Michael J., 4,046,946, Cl. 428-325.000.
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Waterman, Michael W.; and Foster, Samuel L., 4,047,239, Cl. 361-270.000.
Allison, David F., to Scientific Micro Systems, Inc. Semiconductor structure. 4,047,195, Cl. 357-55.000.
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Allport, John J. Self-compensating X-ray or γ-ray thickness gauge. 4,047,029, Cl. 250-273.000.
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Alps Electric Co., Ltd.: *See*—
Takeyama, Fumimasa, 4,047,146, Cl. 338-176.000.
Alsberg, Henry: *See*—
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Wilkinson, Robert M.; and Lyon, James R., 4,046,935, Cl. 428-182.000.
Aluminum Company of America: *See*—
Das, Subodh K.; and Milito, Richard A., 4,046,558, Cl. 75-68.00A.
Alund, Torsten. Sliding vane machine. 4,046,493, Cl. 417-220.000.
Alvi, Zia Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, to Aerpat A.G. Blind rivet. 4,046,053, Cl. 85-72.000.
Amax Inc.: *See*—
Vertes, Michael A.; Ronzio, Richard A.; and Kearns, Tommy C., 4,046,852, Cl. 423-58.000.
Ambasz, Emilio, to Center for Design Research and Development N.V. Chair. 4,046,422, Cl. 297-248.000.
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Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,046,805, Cl. 260-506.000.
Cross, Barrington, 4,046,797, Cl. 260-453.00R.
Cross, Barrington, 4,046,808, Cl. 260-553.00A.
Hardy, William Baptist, 4,046,736, Cl. 260-45.80N.
Kameswaran, Venkataraman; and Addor, Roger William, 4,046,799, Cl. 260-465.00D.
Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,046,787, Cl. 260-399.000.
American Filtrona Corporation: *See*—
Berger, Richard M., 4,046,063, Cl. 93-1.00C.
American Hoechst Corporation: *See*—
Helsley, Grover C.; Strupczewski, Joseph T.; and Gardner, Beth Ann, 4,046,900, Cl. 424-267.000.
American Hospital Supply Corporation: *See*—
Choksi, Pradip Vinobchandra; and Seemayer, Walter, 4,046,145, Cl. 128-215.000.
Schwartz, Robert S.; and Pfister, Ronald R., 4,046,150, Cl. 128-328.000.
American Motors Corporation: *See*—
MacAfee, James E., 4,046,349, Cl. 248-424.000.
American Newspaper Publishers Association, Incorporated: *See*—
Merker, George; Navi, Menashe; and Krupp, Joseph, 4,046,367, Cl. 270-55.000.
American Optical Corporation: *See*—
Gold, James J., 4,047,204, Cl. 358-93.000.
Metcalfe, Richard T.; Granitsas, George A.; and Elliott, Edgar H., 4,046,596, Cl. 148-2.000.
Uhlmann, Donald R.; Snitzer, Elias; Hovey, Richard J.; Chu, Nori Y. C.; and Fournier, Joseph T., Jr., 4,046,586, Cl. 106-194.000.
American Sign and Indicator Corporation: *See*—
Work, Gerald L., 4,045,895, Cl. 40-28.00C.
American Standard Inc.: *See*—
Liska, John Joseph, 4,046,644, Cl. 204-37.00R.
American Tennis Systems, Inc.: *See*—
Clark, Thomas S.; Kennedy, William S.; and Piziali, Robert L., 4,046,131, Cl. 124-71.000.
Amezcua, Saul Ortega. Painting palette. 4,046,250, Cl. 206-1.700.
Ammon, J. Preston; Weaver, Harry R.; and Rodriguez, Claude, to Elfab Corporation. Method of fabrication and assembly of electrical connector. 4,045,868, Cl. 29-629.000.
AMP Incorporated: *See*—
Cassarly, James William, 4,046,452, Cl. 339-198.00H.
Loose, Winfield Warren; and Thomas, Anthony Francis, 4,045,843, Cl. 24-16.0PB.
Reavis, Robert Philmore, Jr., 4,046,446, Cl. 339-99.00R.
Ampex Corporation: *See*—
Garagnon, Gary B., 4,047,231, Cl. 360-36.000.
Amtel, Inc.: *See*—
Griffiths, Evan, 4,045,992, Cl. 72-279.000.
Anderson, Bruce Olen, to Dolese Company, The. Method and apparatus for providing an output indication proportional to the moisture content of particulate material. 4,047,105, Cl. 324-65.00R.
Anderson-Cook Inc.: *See*—
Anderson, Marvin R., 4,045,988, Cl. 72-108.000.
Anderson, Gary L., to United States of America, Navy. Solid state klystron. 4,047,126, Cl. 331-96.000.
Anderson, Jay. Organic digester apparatus and method. 4,046,551, Cl. 71-10.000.
Anderson, John Erling, to Union Carbide Corporation. Slag quenching method for pyrolysis furnaces. 4,046,541, Cl. 65-19.000.
Anderson, Marvin R., to Anderson-Cook Inc. Rotary forming machine and tool. 4,045,988, Cl. 72-108.000.
Anderson, Paul T.; and Dobrosielski, Stephen S., to Westinghouse Electric Corporation. Thermal overload relay. 4,047,140, Cl. 337-75.000.
Anderson, Rebecca M.: *See*—
Andreasson, Betty; and Anderson, Rebecca M., 4,047,165, Cl. 340-227.00R.
Anderson, Richard M.; McGill, Robert S., III; and Ramsey, Robert W., to Heil-Quaker Corporation. Air conditioner control. 4,045,973, Cl. 62-158.000.
Ando, Yujiro; Ohara, Katsunobu; and Shinohara, Yukimasa, to Canon Kabushiki Kaisha. Method and apparatus for electrophotography 4,046,466, Cl. 355-3.00R.
Andrascek, Ernst; and Hadersbeck, Hans, to Siemens Aktiengesellschaft. Process for improving the solderability of electric circuit boards. 4,046,620, Cl. 156-666.000.
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Cormia, Robert L.; Trumbly, Terry A.; and Andresen, Sigurd, 4,046,659, Cl. 204-192.00C.
Andrew Corporation: *See*—
Juds, Richard C.; and Healy, Dennis M., 4,046,451, Cl. 339-177.00R.
Merle, Michel, 4,047,133, Cl. 333-95.00A.
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, to Nehezvegyipari Kutato Intezet; and Eszakmagyarorszagi Vegyimuvek. Carbamoyl-imidazole derivative having pesticidal activity. 4,046,773, Cl. 548-339.000.
Anhalt, John W., to International Telephone and Telegraph Corporation. Spring bushing for conductive back-plane connection. 4,046,445, Cl. 339-95.00D.
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Navi, Menashe, 4,046,370, Cl. 271-3.100.
Anritsu Electric Co., Ltd.: *See*—
Toda, Koichi; Miki, Tetsuya; and Yamaguchi, Haruo, 4,047,115, Cl. 328-151.000.
Antos, George J., to UOP Inc. Method of catalyst manufacture. 4,046,711, Cl. 252-441.000.
Aono, Shigeo, to Nissan Motor Co., Ltd. Air fuel mixture control apparatus for carbureted internal combustion engines. 4,046,118, Cl. 123-119.0EC.
Appel, Adolf; and Reymann, Wolfgang, to Gildemeister Corpoplast GmbH. Apparatus for blow-molding hollow articles, in particular bottles. 4,046,498, Cl. 425-526.000.
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Barker, Ronald C., 4,046,986, Cl. 219-121.0LM.
Aquafilter Corporation: *See*—
Kaye, Paul, 4,046,153, Cl. 131-187.000.
Arai, Akihiro: *See*—
Kitagami, Kazuo; Miyata, Katsuhiko; and Arai, Akihiro, 4,047,206, Cl. 354-152.000.
Arai, Hiroshi: *See*—
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Arant, Gene W. Analog module for reconversion of jaw movement information. 4,045,872, Cl. 32-32.000.
Arcamone, Federico: *See*—
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and Di Marco, Aurelio, 4,046,878, Cl. 424-180.000.
Archibald, John Leheup: *See*—
Cavalla, John Frederick; and Archibald, John Leheup, 4,046,767, Cl. 260-293.770.
Argyll, Marion H. Method and apparatus for transporting sludge while rendering it for conversion into fertilizer. 4,046,689, Cl. 210-59.000.
Arizona Chemical Company: *See*—
Schluenz, Robert William; and Davis, Curry Beach, 4,046,748, Cl. 260-78.0UA.
Armco Steel Corporation: *See*—
Hook, Rollin E., 4,046,601, Cl. 148-15.000.
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Hansson, Bengt; and Svensson, Sigfrid, 4,045,963, Cl. 61-.500.
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Heckles, John S., 4,046,803, Cl. 560-172.000.
Armstrong, Lee R.; and Mercik, Henry J., Jr., to United Technologies Corporation. Engine turbocharger diagnostics. 4,046,003, Cl. 73-118.000.
Arnold, Dan M., to Texaco Inc. Resolution of through tubing fluid flow and behind casing fluid flow in multiple completion wells. 4,047,028, Cl. 250-266.000.
Arny, Deane C.; and Lindow, Steven E., to Wisconsin Alumni Research Foundation. Method for reducing frost damage of plants. 4,045,910, Cl. 47-2.000.
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Mizuno, Masayoshi; Kawamoto, Tadashi; and Iida, Kiichi, 4,046,071, Cl. 101-395.000.
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Kawaguchi, Heizo, 4,047,208, Cl. 354-203.000.
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Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, to Canadian Lady-Canadelle Inc. Apparatus for sewing rings, buckles and the like elements onto tape. 4,046,088, Cl. 112-265.000.
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Ashare, Edward; Rulison, Richard N.; Wright, Lawrence T.; and Coplan, Myron J., to Albany International Corporation. Method of fabrication of hollow filament separatory module. 4,045,851, Cl. 29-157.00R.
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Langer, Heimo J.; Robinson, Kenneth R.; and Throckmorton, Peter E., 4,046,812, Cl. 260-583.00B.
Aspro, Inc.: *See*—
Adahan, Carmeli, 4,046,214, Cl. 180-109.000.
Asselin, George F., to UOP Inc. Aromatic hydrocarbon separation via solvent extraction. 4,046,675, Cl. 208-321.000.
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Brown, Dennis Cockburn; and Murray, Reginald, 4,046,305, Cl. 228-194.000.
Astra Nutrition AB: *See*—
Hallgren, Bo Erik; and Stallberg, Gunnel Anna Maria, 4,046,914, Cl. 424-312.000.
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Jeninga, John, 4,046,413, Cl. 294-19.00A.
Atlas Pacific Engineering Company: *See*—
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Au, Frederick H. F.; and Beckert, Werner F., to United States of America, Energy Research and Development Administration. Method for collecting spores from a mold. 4,046,593, Cl. 134-21.000.
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Ausnit, Steven. Omni-directional fastener. 4,046,408, Cl. 285-188.000.
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Ehman, Michael F.; and Austerman, Stanley B., 4,046,954, Cl. 428-446.000.
Austin, Thomas H.; and Speranza, George P., to Texaco Development Corporation. Low friability polyisocyanurate foams. 4,046,721, Cl. 260-2.5AW.
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Curless, Richard W.; and Federico, Armando, 4,046,137, Cl. 128-1.00D.
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Carman, Charles Jerry; Batiuk, Martin; and Herman, Richard Michael, 4,046,840, Cl. 260-897.00A.
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Schlagmuller, Walter; and Babitzka, Rudolf, 4,046,240, Cl. 192-104.00C.
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Backerud, Stig Lennart. Method for checking and regulating the conditions of crystallization in the solidification of melts. 4,046,509, Cl. 23-230.00A.
Badon, Aime, to Merlin Gerin. Contact structure for puffer-type gas-blast circuit interrupter. 4,046,978, Cl. 200-148.00A.
Bailey, Denis M., to Sterling Drug Inc. 4,5-Dihalopyrrole-2-carboxamides. 4,046,775, Cl. 260-326.200.
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Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, 4,046,821, Cl. 260-654.00A.
Balgemann, Dennis Erwin; and Wong, Michael. Feeding device. 4,046,108, Cl. 119-18.000.
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Irons, Eric, 4,046,691, Cl. 210-83.000.
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Lobach, Ernst, 4,047,030, Cl. 250-281.000.
Winkler, Otto, 4,046,101, Cl. 118-49.100.
Ban, Itsuki. Semiconductor motor controlled for energization by a single position sensing element. 4,047,084, Cl. 318-254.000.
Bandag Incorporation: *See*—
Brodie, Edwin T., 4,046,947, Cl. 428-352.000.
Bandrowski, Michael, Jr.: *See*—
Hamparian, Nshan; and Bandrowski, Michael, Jr., 4,046,114, Cl. 123-41.760.
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Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, to Material Ksz. Dihydroquinoline derivatives of antioxidant activity and a process for the preparation thereof. 4,046,765, Cl. 260-288.0CE.
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Kulczycki, Karol, 4,046,173, Cl. 139-48.000.
Barber, Ellery H., to Bucyrus-Erie Company. Method of machining the upper pad on the swing bearing of a large excavator. 4,046,035, Cl. 82-1.00C.
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Laycock, David Brian; and Barnes, Anthony John, 4,045,986, Cl. 72-60.000.
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Barnsdale, Arthur Derrick. Insert. 4,046,181, Cl. 151-41.730.
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Barr, Paul N., to General Motors Corporation. Tuning system for AM/FM receivers. 4,047,111, Cl. 325-315.000.
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Hansen, Harold M., 4,045,938, Cl. 53-22.00R.
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Cazalaa, Jean Michel; Barthe, Alexandre Jean-Paul; and Derrien, Andre Robert, 4,046,157, Cl. 137-74.000.
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Hartmann, Hans-Joerg; Falk, Roland; Gawlik, Peter; Balz, Werner; Uhl, Karl; Schaefer, Dieter; and Motz, Herbert, 4,046,932, Cl. 428-64.000.
Bassous, Ernest; and Kuhn, Lawrence, to International Business Machines Corporation. Charge electrode array and combination for ink jet printing and method of manufacture. 4,047,184, Cl. 346-75.000.
Bateman, Richard M.; and Clavier, Christian M., to Schlumberger Technology Corporation. Neutron well logging technique for gas detection. 4,047,027, Cl. 250-264.000.
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Bauer, Lowell W.; and Costas, John P., to General Electric Company. Signal processor for pulse-echo system providing interference level compensation and feed-forward normalization. 4,047,172, Cl. 343-17.10R.
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Kilmer, Bill G.; and Baugh, David F., Jr., 4,047,061, Cl. 310-164.000.
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Moller, Erwin; Bausch, Franz Hubert; and Frolich, Martin, 4,045,945, Cl. 53-167.000.

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Winchell, David A.; Miller, Joe A.; and Martin, Jerry D., 4,046,276, Cl. 215-250.000.

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Adelmann, Siegfried; Margotte, Dieter; Merten, Josef; and Vernaleken, Hugo, 4,046,836, Cl. 260-860.000.
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Lehnert, Gunther; Maertens, Dieter; Pampus, Gottfried; and Witte, Josef, 4,046,710, Cl. 252-429.00B.
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,046,796, Cl. 260-453.00P.
Schafer, Rolf, 4,046,865, Cl. 423-499.000.

Bayer, Gerhard: *See—*
Schepers, Bernhard; Bayer, Gerhard; Urmann, Ernst; and Schanz, Klaus, 4,046,855, Cl. 423-130.000.

Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., to Rohm and Haas Company. Herbicidal 4-trifluoromethyl-4'nitrodiphenyl ethers. 4,046,798, Cl. 260-465.00D.

Baynes, Gene P.; and Brooks, Frank W., to General Motors Corporation. Mechanical wheel lock control. 4,046,427, Cl. 303-115.000.

BBC Brown, Boveri & Company, Limited: *See—*
van Iseghem, Paul; Vlasak, Thomas; and Zimmermann, Wolfgang, 4,046,608, Cl. 148-188.000.

Bean, Samuel L.: *See—*
Seeling, Philip F.; and Bean, Samuel L., 4,046,867, Cl. 423-543.000.

Becker, Kunibert; and Weirich, Walter, to Gewerkschaft Eisenhutte Westfalia. Hydraulic control systems for use with mining apparatus. 4,046,060, Cl. 91-414.000.

Becker, Otto Alfred. Insulating flexible composite element. 4,045,931, Cl. 52-406.000.

Becker, Wolf-Jurgen; Deprez, Jacques; and Lehnert, Horst, to Bayer Aktiengesellschaft. Method and an apparatus for determining the inorganic carbon content of a liquid. 4,046,510, Cl. 23-230.00R.

Beckert, Werner F.: *See—*
Au, Frederick H. F.; and Beckert, Werner F., 4,046,593, Cl. 134-21.000.

Beckley, Charles R. Folding furniture piece. 4,046,417, Cl. 297-16.000.

Beckman Instruments, Inc.: *See—*
Akeley, Lloyd Thomas, 4,046,010, Cl. 73-406.000.

Beckmann, Georg: *See—*
Fritz, Kurt; and Beckmann, Georg, 4,046,110, Cl. 122-32.000.

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Wong, Herbert Vernon, 4,047,144, Cl. 338-2.000.

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Bell Telephone Laboratories, Incorporated: *See—*
Baumhauer, John Charles, Jr.; Brzezinski, Alex Michael; Warren, Joe Edward; and Whitesell, Stephen Reed, 4,046,974, Cl. 179-111.00R.
Bjorkholm, John Ernst; and Liao, Paul Foo-Hung, 4,047,026, Cl. 250-251.000.
Dalley, James Edwin, 4,046,969, Cl. 179-18.0FA.
Daugherty, Thomas Henry; and Stone, Dale Eugene, 4,046,964, Cl. 179-15.0BF.
Embree, Milton Luther; Goldthorp, David Clayton; and O'Neill, John Francis, 4,046,968, Cl. 179-18.0FA.
Fraser, David Bruce, 4,046,660, Cl. 204-192.00C.
Huizinga, Donald Dean; Underhill, Edward William; and Whitcomb, James Arthur, 4,046,972, Cl. 179-99.000.
O'Neill, John Francis, 4,046,967, Cl. 179-18.0FA.
Pugh, William Edward, III, 4,046,454, Cl. 350-96.00C.
Rogers, Barry William, 4,046,962, Cl. 179-6.30R.
Rosebrock, Frederick Allen, 4,046,980, Cl. 200-153.0LA.
Shenk, Walter James, 4,046,225, Cl. 184-15.00R.
Sparber, Richard Grant, 4,047,104, Cl. 324-62.000.

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Eggenmuller, Alfred; Bellan, Heinrich; Scherer, Lorenz; Notter, Eugen; and Wagler, Werner, 4,046,068, Cl. 100-65.000.

Benasutti, Louis D.; Neubauer, Jerry L.; and Meyer, Ronald E., to General Motors Corporation. Vertical sliding closure panel for refrigeration door. 4,046,438, Cl. 312-138.00A.

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Benditalia S.p.A.: *See—*
Cadeddu, Leonardo, 4,046,977, Cl. 200-84.00C.

Bendzsak, Gabor J., to Ajax Magnethermic Corporation. High frequency inverter. 4,047,092, Cl. 363-135.000.

Benerito, Ruth R.: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,046,953, Cl. 428-426.000.

Benkoe, Erwin: *See—*
Goldfarb, Adolph E.; and Benkoe, Erwin, 4,045,906, Cl. 46-44.000.
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,046,380, Cl. 273-119.00R.

Bennett, Walter Scott, to Burroughs Corporation. Modular apparatus for binary quotient, binary product, binary sum and binary difference generation. 4,047,011, Cl. 235-164.000.

Benson, Robert C.: *See—*
Tuchyner, Harold J.; and Benson, Robert C., 4,047,117, Cl. 330-4.300.

Berg, Cecilia. Sanitary napkin. 4,046,147, Cl. 128-290.00R.

Berger, Lawrence A.; and Hunt, Robert Carroll, to Uniloc, Incorporated. Method and apparatus for determining boiler water conductivity. 4,047,099, Cl. 324-30.00R.

Berger, Richard M., to American Filtrona Corporation. Method and apparatus for making tobacco smoke filter. 4,046,063, Cl. 93-1.00C.

Bergman, Carl. Plural chamber dispenser. 4,046,288, Cl. 222-135.000.

Bergmann, Ewald; Bareis, Alfred; Dangelmaier, Karl; and Kottmann, Alfred, to L. Schuler GmbH. Apparatus for stacking articles in sheet form for electrical machines. 4,046,264, Cl. 214-8.000.

Berkey, Edgar: *See—*
Bauerle, James E.; Reed, William H.; and Berkey, Edgar, 4,047,101, Cl. 324-33.000.

Bernard, Armand: *See—*
de la Taille, Olivier; Bernard, Armand; and Labadie, Jean-Francois, 4,046,420, Cl. 297-216.000.

Bernardi, Luigi: *See—*
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and Di Marco, Aurelio, 4,046,878, Cl. 424-180.000.

Bernatt, Joseph; and Guleserian, John E., to S&C Electric Company. Breather assembly for electrical apparatus. 4,047,142, Cl. 337-186.000.

Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, to American Cyanamid Company. Substituted-hydroxy-naphthalenedisulfonic acid compounds. 4,046,805, Cl. 260-506.000.

Bessler, Donald U.; and Tacchi, Kenneth J., to Petrolite Corporation. Distillate fuel containing dehazing compositions. 4,046,521, Cl. 44-62.000.

Best, Anthony; and Harman, Harold, to Moulton Developments Limited. Rubber flap damper valves. 4,046,360, Cl. 267-65.00B.

Best, Stanley Gordon, to United Technologies Corporation. Fluidic temperature sensor. 4,046,008, Cl. 73-349.000.

Better Packages, Inc.: *See—*
Ellner, Edwin, 4,047,006, Cl. 235-151.330.

Bhandarkar, Dileep P.: *See—*
Choate, William Clay; and Bhandarkar, Dileep P., 4,047,163, Cl. 340-173.00R.

Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavlanis, Vytautas; and Mackay, Angus Campbell, to Canada Packers Limited. Antiviral 1,2,3,4-tetrahydro-1,4-alkanonaphthalenamine derivatives. 4,046,811, Cl. 260-578.000.

Bigalke, Erhard; Wolf, Jurgen; and Schmelzer, Gunther, to Volkswagenwerk Aktiengesellschaft. Regulating arrangement for internal combustion engines, especially those with a fuel injection system. 4,046,129, Cl. 123-32.0EA.

Bijker, Arnold Jan; and Riemens, Karel, to U.S. Philips Corporation. Digital transmission system for transmitting speech signals at a low bit rate, and transmission for use in such a system. 4,047,108, Cl. 325-38.00B.

Binard, William J.: *See—*
Libman, Gary; Binard, William J.; and Patel, Harish A., 4,046,138, Cl. 128-2.00F.

Bione, Angelo A., to Hammond Corporation. Digital touch responsive tempo generating device. 4,046,048, Cl. 84-1.030.

Bissinger, William E., to PPG Industries, Inc. S-p-Methoxyphenyl N-2,3-dibromopropylthiolcarbamate and its use in the control of plant nematodes. 4,046,912, Cl. 424-300.000.

Bjorkholm, John Ernst; and Liao, Paul Foo-Hung, to Bell Telephone Laboratories, Incorporated. Deflection of atomic beams with isotope separation by optical resonance radiation using stimulated emission and the A.C. Stark effect. 4,047,026, Cl. 250-251.000.

Blackman, Ralph Eugene: *See—*
Parise, Carl; Blackman, Ralph Eugene; and Wimsatt, James M., 4,046,989, Cl. 219-437.000.

Blaine, Geneva, executrix: *See—*
Blaine, Neal Franklin, deceased; and Blaine, Geneva, executrix, 4,046,669, Cl. 208-11.0LE.

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Blaisdell, Donald S.; and Walter, Llewellyn L., to Towmotor Corporation. Floating steering axle. 4,046,218, Cl. 180-155.000.

Bland, Herbert; and Schaul, Joseph B. Vehicle bumper mounted carrier for cycles. 4,046,297, Cl. 224-42.03B.

Bletz, Walter; and Holle, Werner, to Ernst Leitz GmbH. Electronic storage, indicator and exposure time control device for photographic cameras. 4,047,189, Cl. 354-23.00D.
Bloom, Stanley M.: *See*—
Land, Edwin H.; Bloom, Stanley M.; and Rogers, Howard G., 4,046,457, Cl. 350-164.000.
Blount, Richard, to General Electric Company. Photoflash array construction. 4,047,015, Cl. 240-1.300.
Bock, Heinz-Wilhelm: *See*—
Aleite, Werner; and Bock, Heinz-Wilhelm, 4,046,624, Cl. 176-22.000.
Bodor, Nicolae S., to INTERNx Research Corporation. Labile quaternary ammonium salts useful in binding bile acids in warm-blooded animals. 4,046,899, Cl. 424-266.000.
Boehringer Ingelheim GmbH: *See*—
Mentrup, Anton; Schromm, Kurt; Renth, Ernst-Otto; and Traunecker, Werner, 4,046,913, Cl. 424-311.000.
Swetly, Peter, 4,046,879, Cl. 424-180.000.
Boehringer, John R.; and Lecky, John. Sealable activated charcoal gas sampler. 4,046,014, Cl. 73-421.50R.
Boeing Company, The: *See*—
Bryan, Darold Ray, 4,046,347, Cl. 248-346.000.
Bogert, Allen Z. Joint system for wall panel construction. 4,045,932, Cl. 52-460.000.
Boice, Michael F., to Electronic Memories & Magnetics Corporation. Read and write drive system for a 2½D coincident current magnetic core memory. 4,047,164, Cl. 340-174.00M.
Boie, Immo; and Lowski, Dieter, to AGFA-Gevaert, Aktiengesellschaft. Color photographic material containing 2-equivalent yellow couplers. 4,046,575, Cl. 96-100.00N.
Bom, Cornelis Johannes Gerardus: *See*—
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,046,202, Cl. 172-72.000.
Bonar & Bemis Ltd.: *See*—
Flantua, Gysbertus, 4,045,941, Cl. 53-35.000.
Bonds, James Vaull, to McEvoy Oilfield Equipment Co. Run-in and tie back apparatus. 4,046,405, Cl. 285-3.000.
Bonne, Ulrich, to Honeywell Inc. Electro-optic cell with transverse electric field. 4,046,456, Cl. 350-160.00R.
Bonneau, Benoit. Non-return valve for preventing back flow of waste waters. 4,046,161, Cl. 137-247.170.
Booth, Thomas Allan; and Scholten, Frank Lynn, to Addressograph Multigraph Corporation. Exposure control system for photocomposition machines. 4,046,475, Cl. 355-69.000.
Booth, Vernard S.; and Oswalt, Billy W., to Olinkraft, Inc. Two cell bulk container. 4,046,307, Cl. 229-15.000.
Borba, Paul A.: *See*—
Miller, Harry R.; and Borba, Paul A., 4,046,109, Cl. 119-92.000.
Borg-Warner Corporation: *See*—
Rickert, Paul Ellis, 4,046,844, Cl. 261-34.00A.
van Hesden, Jan Willem, 4,046,524, Cl. 51-306.000.
Born, Grant R. Cervix photographic method. 4,046,140, Cl. 128-2.00R.
Bors, Gyozo: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.
Boudry, Michael Robert, to U.S. Philips Corporation. Data transmission systems. 4,047,159, Cl. 364-900.000.
Boughton, Edward M.: *See*—
Kuonen, Frederick L.; and Boughton, Edward M., 4,046,100, Cl. 118-8.000.
Bourdo, Charles A. Progressive die sensor. 4,046,040, Cl. 83-63.000.
Bowen, James H., to W. G. Jaques Company. Liquid level indicator and flow measuring device. 4,045,876, Cl. 33-126.600.
Bowman, James Lee, to Long-Lok Fasteners Corporation. Apparatus and method of forming self-locking fastener. 4,046,106, Cl. 118-620.000.
Boyd, George F., Sr., to Tri-State Motor Transit Company. Retentive base for shipping cask. 4,046,345, Cl. 248-154.000.
Boysen, Mogens Bredal, to 4K - International A/S. Pulse generator. 4,047,047, Cl. 307-106.000.
BP Chemicals Limited: *See*—
Thornburrow, Peter Robert, 4,046,740, Cl. 260-75.00N.
Brackenridge, Alexander Robertson, executor: *See*—
Paterson, Donald MacDougal, deceased; and Brackenridge, Alexander Robertson, executor, 4,046,044, Cl. 83-489.000.
Bradley, William David: *See*—
Alvi, Zia Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, 4,046,053, Cl. 85-72.000.
Brandes, Guenther. Rolling pin with dough thickness control. 4,045,850, Cl. 29-111.000.
Brandt, Bernd; Jansen, Peter; and Liesenfeld, Heinz, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, DT. System for venting the heating pipes of a tubular rotary dryer. 4,045,881, Cl. 34-138.000.
Branham, Charles Escom; Steury, Thomas Dean; and Woodward, John Maury, to International Business Machines Corporation. Dual mode electrophotographic apparatus having dual function printing beam. 4,046,471, Cl. 355-14.000.
Brannstrom, Roine; and Nilsson, Goran, to Stal-Laval Turbin AB. Regulating means for gas turbine plant. 4,045,955, Cl. 60-39.28R.
Bratyshev, Igor Petrovich: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.
Braukmann Armaturen AG: *See*—
Braukmann, Bernhard W.; and Vollmer, Rudolph, 4,046,692, Cl. 210-108.000.
Braukmann, Bernhard W.; and Vollmer, Rudolph, to Braukmann Armaturen AG. Domestic water control unit. 4,046,692, Cl. 210-108.000.
Braun, Anton. Free piston engine fuel feeding apparatus. 4,046,115, Cl. 123-46.00R.
Braun, Eugene R.; and Richards, Elmer A., to Eaton Corporation. Start control. 4,046,032, Cl. 74-865.000.
Bray, Donald Thedore, to Desalination Systems, Inc. Simultaneous production of multiple grades of purified water by reverse osmosis. 4,046,685, Cl. 210-23.00H.
Brazerol, William A.: *See*—
Briggs, Southwick W.; and Brazerol, William A., 4,046,697, Cl. 210-457.000.
Brennen, Michael B.: *See*—
Gyugyi, Laszlo; Stacey, Eric J.; and Brennen, Michael B., 4,047,097, Cl. 323-119.000.
Brenner, George John, Jr., to Emerson Electric Co. Frost detector. 4,045,971, Cl. 62-140.000.
Brenner, Wolf, to Hoffmann-La Roche Inc. Process for producing ketoisophorone. 4,046,813, Cl. 260-586.00P.
Breyley, Thomas E. Walking aid. 4,046,374, Cl. 272-70.300.
Bridgestone Tire Company Limited: *See*—
Takahashi, Hidenori; Tamura, Hiroshi; Watanabe, Shigeo; and Sogi, Toshiyuki, 4,046,183, Cl. 152-362.00R.
Briggs, Southwick W.; and Brazerol, William A. Pleated paper filter. 4,046,697, Cl. 210-457.000.
Brinlee, Homer L. Vacuum subjugated accelerator. 4,046,117, Cl. 123-103.00C.
Briody, Ronald Francis: *See*—
Coast, Geoffrey; and Briody, Ronald Francis, 4,046,630, Cl. 176-39.000.
Bristol-Myers Company: *See*—
Samour, Carlos M.; and Vida, Julius A., 4,046,894, Cl. 424-254.000.
British Petroleum Company Limited, The: *See*—
Burbidge, Bernard Whiting; Cook, Terence John; and Crowson, Roger, 4,046,671, Cl. 208-138.000.
Brodie, Edwin T., to Bandag Incorporation. Material and methods for bonding treads to tires. 4,046,947, Cl. 428-352.000.
Brokenshire, John Leslie: *See*—
Showalter, Lane Crawford; Brokenshire, John Leslie; and Watts, Geoffrey B., 4,045,997, Cl. 73-23.000.
Brooker, Lenon G.: *See*—
McCaskey, Harold O., Jr.; and Brooker, Lenon G., 4,046,937, Cl. 428-211.000.
Brooks, Frank W.: *See*—
Baynes, Gene P.; and Brooks, Frank W., 4,046,427, Cl. 303-115.000.
Brorein, William J., to General Cable Corporation. Connector for use with printed wiring circuits. 4,046,444, Cl. 339-91.00R.
Broucksou, Robert H., to Eaton Corporation. Adjustable steering column support. 4,046,024, Cl. 74-493.000.
Brown, Alfred; Hager, Stephen F.; Chichakli, Moutaz; and Wu, Ching H., to Texaco Inc. Secondary oil recovery process. 4,046,196, Cl. 166-273.000.
Brown, Dennis Cockburn; and Murray, Reginald, to Associated Engineering Limited. Metallic bonding method. 4,046,305, Cl. 228-194.000.
Brown, Michael Kenneth, to Burroughs Corporation. Conditioning system for transducer signals. 4,046,961, Cl. 179-1.00P.
Brown, Villy, to Aetna Bearing Company. Articulated thrust bearing. 4,046,436, Cl. 308-233.000.
Brown, William B., to General Motors Corporation. Process for electrocoating aminimide containing compositions. 4,046,658, Cl. 204-181.000.
Bruckner, Gyorgyi: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.
Bruml, Norman A. Display package. 4,046,251, Cl. 206-45.140.
Bruning, William E., to OMNI Corporation. Temporary door installation for grain carrying freight car. 4,046,185, Cl. 160-368.00G.
Brunninger, Manfred: *See*—
Theurer, Josef; and Brunninger, Manfred, 4,046,077, Cl. 104-2.000.
Brunswick Corporation: *See*—
Shaikh, Nisar, 4,046,219, Cl. 181-211.000.
Bryan, Darold Ray, to Boeing Company, The. Adaptor assembly. 4,046,347, Cl. 248-346.000.
Bryant, Nelson H.; Hobler, Ross L.; Allen, Wilbur J.; and Poliseo, Joseph W., to Powers Manufacturing, Inc. Control system for computer controlled identification of bottles. 4,047,000, Cl. 235-151.100.
Bryant, Richard: *See*—
Kruk, Anthony Richard; Bryant, Richard; and Harper, Samuel, 4,045,855, Cl. 29-252.000.

Brzezinski, Alex Michael: *See—*
Baumhauer, John Charles, Jr.; Brzezinski, Alex Michael; Warren, Joe Edward; and Whitesell, Stephen Reed, 4,046,974, Cl. 179-111.00R.

Bucyrus-Erie Company: *See—*
Barber, Ellery H., 4,046,035, Cl. 82-1.00C.
Sterner, Russell L., 4,045,936, Cl. 52-632.000.

Budinski, John A.; and Flora, Raymond A., to General Motors Corporation. Windshield wiper drive mechanism having a depressed park position. 4,046,020, Cl. 74-70.000.

Buehler, Arthur: *See—*
Zweifel, Hans Heini; Buehler, Arthur; and Fasciati, Alfred, 4,046,507, Cl. 8-79.000.

Buffington, James F.; and Norris, Lee E. Grain drying apparatus and process. 4,045,882, Cl. 34-171.000.

Bugaut, Andree: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,046,786, Cl. 260-396.00N.

Buono, Dennis F.; Carlson, Nils G.; Hibner, David H.; and Moringiello, Donald C., to United Technologies Corporation. Damped intershaft bearing and stabilizer. 4,046,430, Cl. 308-26.000.

Burbidge, Bernard Whiting; Cook, Terence John; and Crowson, Roger, to British Petroleum Company Limited, The. Reduction of platinum group metal catalysts. 4,046,671, Cl. 208-138.000.

Burden, David M.; and Malaney, Frank N., to Western Electric Company, Inc. Fused resistive electrical protection device. 4,047,143, Cl. 337-239.000.

Burg, Karlheinz: *See—*
Sextro, Gunter; Burg, Karlheinz; Leugering, Hans Joachim; Schlaf, Helmut; and Heller, Alwin, 4,046,738, Cl. 260-67.0FP.

Burkwall, Morris P., Jr., to Quaker Oats Company, The. Shelf stable, semi-moist simulated egg. 4,046,922, Cl. 426-104.000.

Burnett, Joseph C., Jr.; Hicks, John J.; and Hovey, Leonard L., to Monsanto Company. Electrolytic hydrodimerization process improvement. 4,046,651, Cl. 204-73.00R.

Burnett, Walter L. Dental articulator. 4,045,873, Cl. 32-32.000.

Burnham, Emily A. Female urinal apparatus. 4,045,828, Cl. 4-110.000.

Burnham, William E. Internal combustion engines. 4,046,116, Cl. 123-48.00R.

Burns, Dallas D., to Honeywell Inc. Expanded ring bellows. 4,045,959, Cl. 60-632.000.

Burroughs Corporation: *See—*
Bennett, Walter Scott, 4,047,011, Cl. 235-164.000.
Brown, Michael Kenneth, 4,046,961, Cl. 179-1.00P.
Dijkstra, Edsger W., 4,047,243, Cl. 364-200.000.
Holz, George E., 4,047,169, Cl. 340-324.00M.
Hutchison, Robert V., 4,046,442, Cl. 339-17.0CF.
Kobylarz, Lawrence P.; and Mack, Ronald H., 4,047,229, Cl. 360-2.000.
Lau, Edward H.; and Marino, Francis C., 4,047,241, Cl. 361-288.000.
Sevak, Nitin M., 4,046,371, Cl. 271-178.000.

Burton, David C., to Phillips Petroleum Company. Device for installation of plastic fifth wheel liner on a truck trailer. 4,045,854, Cl. 29-235.000.

Burton, Pamela M.: *See—*
White, Abraham; and Burton, Pamela M., 4,046,877, Cl. 424-177.000.

Burton, Vance P.; and Mikulicz, Michael Z., to UOP Inc. Hydrogen fluoride-catalyzed alkylation apparatus. 4,046,516, Cl. 23-288.00E.

Busam, Donald H.: *See—*
Redelman, Paul E.; and Busam, Donald H., 4,046,267, Cl. 214-16.40B.

Busby, Llewellyn D.: *See—*
Toft, Kaj; and Busby, Llewellyn D., 4,045,894, Cl. 38-77.830.

Busch, Lothar; and Franck, Gunter, to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH. Lamp having amalgam contained in a porous silicate mass. 4,047,071, Cl. 313-490.000.

Buschmann, Sylvester. Fence wire stretching device. 4,046,353, Cl. 254-83.000.

Buzzard, Kenneth J., to Westinghouse Air Brake Company. Wayside signaling system for railroad cab signals and speed control. 4,046,342, Cl. 246-34.00R.

Bye, Carolyn N., to National Casein of New Jersey. Proteinaceous adhesive composition. 4,046,955, Cl. 428-479.000.

Byer, John A. Gun cleaner. 4,045,900, Cl. 42-1.00R.

C. van der Lely N. V.: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,046,202, Cl. 172-72.000.

Cadeddu, Leonardo, to Benditalia S.p.A. Fluid reservoir. 4,046,977, Cl. 200-84.00C.

Cairns, James Anthony; Nelson, Richard Stuart; and Barnfield, Rhydwyn William, to United Kingdom Atomic Energy Authority. Catalysts sputtered on substantially nonporous low surface area particulate supports. 4,046,712, Cl. 252-447.000.

California and Hawaiian Sugar Company: *See—*
Riffer, Richard, 4,046,590, Cl. 127-46.00B.

California Institute of Technology: *See—*
Rembaum, Alan; Yen, Shiao-Ping S.; and Dreyer, William J., 4,046,720, Cl. 260-2.50B.
Rembaum, Alan, 4,046,750, Cl. 526-310.000.

Campbell, Kenneth J., to United States of America, Navy. RF signal generator. 4,047,121, Cl. 331-76.000.

Canada, Her Majesty the Queen in Right of: *See—*
Hart, John A. H., 4,046,939, Cl. 428-311.000.

Canada Packers Limited: *See—*
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Mackay, Angus Campbell, 4,046,811, Cl. 260-578.000.

Canadian International Paper Company: *See—*
Sexton, Ernest Arthur, 4,046,621, Cl. 162-40.000.

Canadian Lady-Canadelle Inc.: *See—*
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,088, Cl. 112-265.000.
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,089, Cl. 112-265.000.

Canadian Pacific Limited: *See—*
Kruk, Anthony Richard; Bryant, Richard; and Harper, Samuel, 4,045,855, Cl. 29-252.000.

Canadian Patents and Development Limited: *See—*
Moroz, Leonard Arthur, 4,046,635, Cl. 195-103.700.
Shen, Kuo-Cheng, 4,046,585, Cl. 106-123.0LC.

Canon Kabushiki Kaisha: *See—*
Ando, Yujiro; Ohara, Katsunobu; and Shinohara, Yukimasa, 4,046,466, Cl. 355-3.00R.
Kawamura, Naoto, 4,046,459, Cl. 350-214.000.
Mashimo, Yukio; Sakurada, Nobuaki; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,047,187, Cl. 354-23.00D.
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, 4,047,194, Cl. 354-149.000.
Shimazaki, Mamoru; Toyama, Masamichi; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,464, Cl. 352-141.000.
Toyama, Masamichi; Takigawa, Tomoshi; Shimazaki, Mamoru; Okajima, Hidekazu; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,465, Cl. 352-175.000.

Capeling, Thomas W.; and Lovins, Robert G. Apparatus and method for making decorative tiles. 4,046,090, Cl. 113-1.00K.

Capelle, Anton; and Scholten, Heinz, to Chemische Werke Huls Aktiengesellschaft. Additive for improving the adhesion to textiles of hot melt adhesives based on copolyamides. 4,046,747, Cl. 260-78.00S.

Cardinal Extrusions Co.: *See—*
Reinhardt, James Donald, 4,045,898, Cl. 40-156.000.

Carl Hurth Maschinen- und Zahnradfabrik: *See—*
Loos, Herbert; Seitz, Max; and Erhardt, Manfred, 4,045,917, Cl. 51-123.00G.

Carl Still Recklinghausen, Firma: *See—*
Tippmer, Kurt, 4,045,970, Cl. 62-95.000.

Carl Wurth Maschinen- und Zahnradfabrik: *See—*
Seitz, Max, 4,045,916, Cl. 51-123.00G.

Carl Zeiss-Stiftung: *See—*
Grosskopf, Rudolf, 4,047,205, Cl. 358-107.000.

Carlson, Nils G.: *See—*
Buono, Dennis F.; Carlson, Nils G.; Hibner, David H.; and Moringiello, Donald C., 4,046,430, Cl. 308-26.000.

Carman, Charles Jerry; Batiuk, Martin; and Herman, Richard Michael, to B. F. Goodrich Company, The. Thermoplastic polymer blends of an EPDM polymer having a high ethylene length index with polyethylene. 4,046,840, Cl. 260-897.00A.

Caron, Aristide Leon; and Caron, Paulette Marie Laure. Combination cabinet for audio-visual teaching. 4,046,437, Cl. 312-20.000.

Caron, Paulette Marie Laure: *See—*
Caron, Aristide Leon; and Caron, Paulette Marie Laure, 4,046,437, Cl. 312-20.000.

Carr, David M.; and Chandler, Thomas O., to Monsanto Company. Core transfer process. 4,045,858, Cl. 29-427.000.

Carrie, George W., to Garrett Corporation, The. Pneumatic gun system and method. 4,046,056, Cl. 89-12.000.

Carroll, Max L., Jr., to Eastman Kodak Company. Polyester-polyolefin blend film or coating composition. 4,046,837, Cl. 260-873.000.

Carson, Don B., to UOP Inc. Power generation and potable water recovery from salinous water. 4,046,639, Cl. 203-11.000.

Carson, Don B., to UOP Inc. Power generation and potable water recovery from salinous water. 4,046,640, Cl. 203-11.000.

Carson, Edward H. D.: *See—*
Smith, Royal; and Carson, Edward H. D., 4,046,418, Cl. 297-118.000.

Carter, Neil: *See—*
Lewis, Cyril John; Carter, Neil; and Ray, Neil Hunter, 4,046,540, Cl. 65-18.000.

Case Existological Laboratories, Ltd.: *See—*
Case, John N., 4,046,178, Cl. 141-1.000.

Case, John N., to Case Existological Laboratories, Ltd. Floating bag for pollution study. 4,046,178, Cl. 141-1.000.

Cashion, Charles M.: *See—*
Paxton, Grady W., Jr.; Howeth, Bobby W.; Mehal, Edward W.; Cashion, William F.; and Cashion, Charles M., 4,047,045, Cl. 250-551.000.

Cashion, William F.: *See—*
Paxton, Grady W., Jr.; Howeth, Bobby W.; Mehal, Edward W.; Cashion, William F.; and Cashion, Charles M., 4,047,045, Cl. 250-551.000.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 4,045,952, Cl. 58-23.00R.

Cass, Ann E., to Continental Group, Inc., The. Composite end panel for can or similar container. 4,046,306, Cl. 229-5.700.

Cassarly, James William, to AMP Incorporated. Electrical connector housing having an improved locking means. 4,046,452, Cl. 339-198.00H.

Cassidy, John Edward, to Imperial Chemical Industries Limited. Refractory binder. 4,046,581, Cl. 106-85.000.

Castel Mac S.p.A.: *See*—
Mazzini, Leone, 4,045,979, Cl. 62-352.000.

Castleman, Cordell V., to Magnetic Controls Company. Ringing detector for telephone circuits. 4,046,970, Cl. 179-84.00L.

Castonguay, Rene: *See*—
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,088, Cl. 112-265.000.
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,089, Cl. 112-265.000.

Catlett. John C., to Stanley Works, The. Automatic door operator. 4,045,914, Cl. 49-334.000.

Cavalla, John Frederick; and Archibald, John Leheup, to John Wyeth & Brother Limited. Piperidino compounds. 4,046,767, Cl. 260-293.770.

Cavitt, Stanley B., to Texaco Development Corporation. Method of olefin epoxidation. 4,046,783, Cl. 260-348.330.

Cazalaa, Jean Michel; Barthe, Alexandre Jean-Paul; and Derrien, Andre Robert. Electrical control for inflating valve for containers for compressed liquefied or dissolved gas. 4,046,157, Cl. 137-74.000.

Cebal: *See*—
Winckler, Richard, 4,045,860, Cl. 29-451.000.

Cebrian, Gregorio Ramon, to Fundacion de Estudios Farmaco-Biologicos. Treatment of cells. 4,046,918, Cl. 424-331.000.

Cebrian, Gregorio Ramon, to Fundacion de Estudios Farmaco-Biologicos. Treatment of cells. 4,046,919, Cl. 424-338.000.

Cecil, Richard R.: *See*—
Paynter, John D.; Fuqua, Beverly B.; and Cecil, Richard R., 4,046,673, Cl. 208-140.000.

Celada, Juan; and MacKay, Patrick W., to Fierro Esponja, S.A. Direct gaseous reduction of oxidic metal ores with dual temperature cooling of the reduced product. 4,046,556, Cl. 75-35.000.

Center for Design Research and Development N.V.: *See*—
Ambasz, Emilio, 4,046,422, Cl. 297-248.000.

Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie: *See*—
Economopoulos, Mario, 4,046,599, Cl. 148-12.00B.

Centre Electronique Horloger S.A.: *See*—
Perotto, Jean Felix; and Vittoz, Eric, 4,047,010, Cl. 235-156.000.

Chad, Kenneth Ernest: *See*—
Sefton, Philip Charles; and Chad, Kenneth Ernest, 4,046,991, Cl. 219-497.000.

Challen, Richard F., to General Electric Company. Digital tone generator for use with radio transmitters and the like. 4,047,009, Cl. 235-152.000.

Chambers, Joseph W. Solid waste comminutor. 4,046,324, Cl. 241-46.060.

Champagne, Patrick Joseph, to Control Data Corporation. Printed circuit card guide. 4,046,443, Cl. 339-66.00M.

Champion International Corporation: *See*—
Wright, John T., 4,045,913, Cl. 49-307.000.

Chandler, Thomas O.: *See*—
Carr, David M.; and Chandler, Thomas O., 4,045,858, Cl. 29-427.000.

Chang, Wen-Hsuan: *See*—
Scriven, Roger L.; and Chang, Wen-Hsuan, 4,046,729, Cl. 260-29.2TN.

Chapman, William L.; and Newlin, Larry L., to Continental Oil Company. Digital controlled low frequency power amplifier. 4,047,090, Cl. 363-34.000.

Charamella, John Barrie; Long, John Warren; and Stone, Jerry Lloyd, to Du Pont de Nemours, E. I., and Company. Color design method. 4,046,476, Cl. 355-77.000.

Charlton Company, Inc.: *See*—
Spound, Albert M.; and Day, Robert C., 4,046,421, Cl. 297-232.000.

Chase, Ascher, to General Foam Plastics Corporation. Shuttle toy having two orifices and shock absorbing means. 4,046,379, Cl. 273-95.0AA.

Chase, Paul Herbert, to Combustion Engineering, Inc. Digital-storage filter. 4,046,997, Cl. 235-150.500.

Chaudhari, Praveen; Cuomo, Jerome John; and Matthews, John Wauchope, to International Business Machines Corporation. Method for preparing large single crystal thin films. 4,046,618, Cl. 156-603.000.

Chemap AG: *See*—
Muller, Hans; and Grob, Louis, 4,046,789, Cl. 260-412.800.

Chemcut Corporation: *See*—
Goffredo, Daniel L.; and Shakley, Conrad Dale, 4,046,248, Cl. 198-583.000.

Chemetics International Ltd.: *See*—
Westerlund, Gothe Oscar, 4,046,665, Cl. 204-282.000.

Chemische Werke Huls Aktiengesellschaft: *See*—
Baxmann, Fritz; Frese, Albert; Roben, Hermann; and Wolpers, Jurgen, 4,046,945, Cl. 428-282.000.
Capelle, Anton; and Scholten, Heinz, 4,046,747, Cl. 260-78.00S.
Sridhar, Srinivasan; and Hedden, Horst, 4,046,746, Cl. 260-78.00S.

Chen, Nai Yuen; and Heinemann, Heinz, to Mobil Oil Corporation. Pre-engine converter for use with fuels containing oxygenated compounds. 4,046,522, Cl. 48-102.00A.

Cheng, Paul J., to Phillips Petroleum Company. Process to produce carbon black. 4,046,864, Cl. 423-450.000.

Cherry, Kenneth F. Prismatic perspective control device. 4,046,461, Cl. 350-287.000.

Chesley, Ronald F.: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,046,380, Cl. 273-119.00R.

Chevron Research Company: *See*—
Kemp, Jacob D.; and Sieg, Robert P., 4,046,520, Cl. 44-56.000.
Liston, Thomas V., 4,046,702, Cl. 252-33.400.
Olund, Sven A., 4,046,533, Cl. 62-468.000.
Ransley, Derek L., 4,046,824, Cl. 260-667.000.

Chiba, Shigeo: *See*—
Izumi, Takichiro; Chiba, Shigeo; and Kobayashi, Kazumitsu, 4,046,136, Cl. 126-271.000.

Chichakli, Moutaz: *See*—
Brown, Alfred; Hager, Stephen F.; Chichakli, Moutaz; and Wu, Ching H., 4,046,196, Cl. 166-273.000.

Chieger, George; Schwartz, Robert B.; and Banerjea, Tara N., to Fruehauf Corporation. Air cargo container. 4,046,278, Cl. 220-1.500.

Chloride Group Limited: *See*—
Edwards, William Howard, 4,046,642, Cl. 204-2.100.

Choate, William Clay; and Bhandarkar, Dileep P., to Texas Instruments Incorporated. Fault-tolerant cell addressable array. 4,047,163, Cl. 340-173.00R.

Choksi, Pradip Vinobchandra; and Seemayer, Walter, to American Hospital Supply Corporation. Syringe connector. 4,046,145, Cl. 128-215.000.

Chomerics, Inc.: *See*—
Seeger, Richard E., Jr., 4,046,975, Cl. 200-5.00A.

Chu, Nori Y. C.: *See*—
Uhlmann, Donald R.; Snitzer, Elias; Hovey, Richard J.; Chu, Nori Y. C.; and Fournier, Joseph T., Jr., 4,046,586, Cl. 106-194.000.

Chugoku Marine Paints, Ltd.: *See*—
Matsuda, Sumio; and Kudara, Hajime, 4,046,791, Cl. 260-429.700.

Chung, William John: *See*—
Mitchell, Robert Lee; and Chung, William John, 4,046,872, Cl. 424-52.000.

Ciba-Geigy AG: *See*—
Marthaler, Max, 4,046,566, Cl. 96-7.000.
Zweifel, Hans Heini; Buehler, Arthur; and Fasciati, Alfred, 4,046,507, Cl. 8-79.000.

Ciba-Geigy Corporation: *See*—
Baccini, Peter; and Fory, Werner, 4,046,793, Cl. 260-439.00R.
Garner, Robert; and Petitpierre, Jean-Claude, 4,046,776, Cl. 260-326.14R.
Holt, Brian; and Randell, Donald Richard, 4,046,737, Cl. 260-45.80N.
Hubele, Adolf, 4,046,911, Cl. 424-285.000.
Mory, Rudolf; and Muller, Rolf, 4,046,755, Cl. 260-174.000.
Mueller, Karl Friedrich; and Falk, Robert A., 4,046,944, Cl. 428-262.000.
Muller, Albrecht, 4,046,777, Cl. 260-326.260.
Rasberger, Michael; Rody, Jean; Moser, Paul; and Muller, Helmut, 4,046,788, Cl. 260-404.000.
Zimmerli, Willi, 4,046,734, Cl. 260-38.000.

Ciba Geigy (UK) Limited: *See*—
Smith, Malcolm John; Miles, Peter; Richardson, Norman; and Finan, Michael Anthony, 4,046,707, Cl. 252-180.000.

Ciliberti, David F.: *See*—
Westervelt, Dean C.; Scala, Luciano C.; Saunders, Howard E.; and Ciliberti, David F., 4,046,592, Cl. 134-1.000.

Cimon, Denis Gaston: *See*—
Paris, Gerard Yvon; and Cimon, Denis Gaston, 4,046,887, Cl. 424-232.000.

City Products Corporation: *See*—
Richardson, William H., 4,045,899, Cl. 40-322.000.

City Tank Corporation: *See*—
McKenzie, Roland W., 4,046,269, Cl. 214-83.300.

Clapham, Leslie, to United Kingdom Atomic Energy Authority. Plugs. 4,046,631, Cl. 176-79.000.

Clark, John A., Jr., to Harsco Corporation. Water heater. 4,046,189, Cl. 165-39.000.

Clark, Lowell E.; Roop, Raymond M.; and Volk, Charles E., to Motorola, Inc. Semiconductor devices with improved turn-off characteristics. 4,047,218, Cl. 357-34.000.

Clark, Thomas S.; Kennedy, William S.; and Piziali, Robert L., to American Tennis Systems, Inc. Tennis ball collection, pick-up and propelling system. 4,046,131, Cl. 124-71.000.

Clark, William F. Bed sheet. 4,045,831, Cl. 5-334.00R.

Clark, William H.: *See*—
Dermond, Hartley P., 4,046,485, Cl. 404-123.000.

Clausen, Edward M., to General Electric Company. Sodium halide discharge lamp with an alumina silicate barrier zone in fused silica envelope. 4,047,067, Cl. 313-221.000.

Clausen, Eva: *See*—
Reinhardt, Helmut; Gratzfeld, Everhard; and Clausen, Eva, 4,046,861, Cl. 423-367.000.

Clavier, Christian M.: *See*—
Bateman, Richard M.; and Clavier, Christian M., 4,047,027, Cl. 250-264.000.

Clemson, Daniel Michael: *See*—
Kerllenevich, Natalio; and Clemson, Daniel Michael, 4,047,246, Cl. 364-200.000.

Cleveland, Joseph J.: *See*—
Warner, Leadom A.; and Cleveland, Joseph J., 4,046,612, Cl. 156-205.000.

Clissett, Dennis Edward, to Imperial Chemical Industries Limited. Process for bulking knitted fabric articles. 4,045,981, Cl. 66-147.000.

Cloud, Nathan; and Smith, James Edwin, to Du Pont de Nemours, E. I., and Company. Apparatus to assist doffing pckages in a yarn windup. 4,046,328, Cl. 242-18.00A.

Cloud, Wayne B., to Mobil Oil Corporation. Electrolinking method for

improving permeability of hydrocarbon formation. 4,046,194, Cl. 166-248.000.
Clovis, James S.: *See—*
Cunningham, Virginia L.; Clovis, James S.; and Hurwitz, Marvin J., 4,046,688, Cl. 210-37.00R.
Coast Catamaran Corporation: *See—*
Lomas, James Arthur, III; Lee, Ronald La Verne; and Holland, Andrew Macdonald, 4,046,091, Cl. 114-39.000.
Coast, Geoffrey; and Briody, Ronald Francis, to United Kingdom Atomic Energy Authority. Process plant. 4,046,630, Cl. 176-39.000.
Cobb, Malcolm Carnie; and Elliott, Pamela, to Imperial Chemical Industries Limited. Post dyeing resin particles fixed to resin base. 4,046,505, Cl. 8-18.00R.
Cochran, David S.: *See—*
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; Baum, Allen J.; Cochran, David S.; and Tung, Chung C., 4,047,012, Cl. 235-156.000.
Cocksedge, Kenneth W., to Xerox Corporation. Phase-sensitive transducer apparatus. 4,047,086, Cl. 318-608.000.
Cohen, Edward M.; and Oberholtzer, Earl R., to Merck & Co., Inc. Process for preparing a novel benzylamine hydrate. 4,046,804, Cl. 260-501.210.
Colbers, Gerardus Johannes Baptist: *See—*
Einerhand, Johan Jozef; Colbers, Gerardus Johannes Baptist; Huck, Wilhelmus Martha Andreas; and Geurts, Herman Jozef Johannes Maria, 4,046,588, Cl. 106-298.000.
Cole, Marc. Process for desalination with chlor-alkali production in a mercury diaphragm cell. 4,046,654, Cl. 204-99.000.
Colgate Palmolive Company: *See—*
Bauman, Robert Andrew, 4,046,873, Cl. 424-54.000.
Mitchell, Robert Lee; and Chung, William John, 4,046,872, Cl. 424-52.000.
Collepardi, Mario, to Emesa Aktiengesellshaft. Method of producing expansive and high strength cementitious pastes, mortars and concretes. 4,046,583, Cl. 106-90.000.
Collette, Joannes Jacobus Maria: *See—*
Abrahams, Jacobus Hubertus; Collette, Joannes Jacobus Maria; and Walters, Robertus Aloysius Tarcisius Johannes, 4,045,978, Cl. 60-521.000.
Collins, Michael J.: *See—*
Appelbaum, Alfred J.; Collins, Michael J.; and Hanfling, Jerome D., 4,047,179, Cl. 343-768.000.
Combustion Engineering, Inc.: *See—*
Chase, Paul Herbert, 4,046,997, Cl. 235-150.500.
Madewell, George Robison, 4,047,096, Cl. 323-19.000.
Musick, Charles Ronald; and Torres, Jose Marcelo, 4,046,625, Cl. 176-24.000.
Comeaux, George E. Board game with selector die. 4,046,381, Cl. 273-134.0AD.
Comerford, Liam David; and Zory, Peter Stephen, Jr., to International Business Machines Corporation. Planar solid state laser array. 4,047,124, Cl. 331-94.50H.
Commonwealth Scientific and Industrial Research Organization: *See—*
Stringer, Robert Kenneth; and Johnston, Kenneth Alan, 4,046,661, Cl. 204-195.00S.
Compressor Controls Corporation: *See—*
Rutshtein, Alexander; and Staroselsky, Naum, 4,046,490, Cl. 417-28.000.
Congleton, Wayne L., to Dolco Packaging Corporation. Container construction. 4,046,256, Cl. 206-497.000.
Conklin, Thomas, to North American Philips Corporation. Pyroelectric vidicon having target heating means on accelerating anode. 4,047,070, Cl. 313-388.000.
Conlee, Charles J.: *See—*
James, Arthur M.; and Conlee, Charles J., 4,046,414, Cl. 294-81.00R.
Connell, Robert I. Four way security door. 4,046,410, Cl. 292-36.000.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Max, to Warner-Lambert Company. 4,10-Dihydro-4,10-dioxo-1H-1-benzopyrano[3,2-b]pyridine-2-carboxylic acids and esters. 4,046,769, Cl. 260-295.00T.
Consolidation Coal Company: *See—*
Gorin, Everett; Jasulaitis, William A.; Wasson, George E.; and Theodore, Frank William, 4,046,496, Cl. 425-222.000.
Consortium fur Elektrochemische Industrie GmbH: *See—*
Deinhammer, Wolfgang; Wick, Manfred; and Macri, Antonio, 4,046,792, Cl. 260-429.700.
Construction Systems & Equipment, Inc.: *See—*
Twitchell, F. Shawn, 4,046,357, Cl. 259-147.000.
Continental Can Company, Inc.: *See—*
LaRocca, James J.; and Mazur, Richard A., 4,047,003, Cl. 235-151.110.
Continental Disc Corporation: *See—*
Hansen, Franklin A., 4,046,280, Cl. 220-89.00A.
Continental Group, Inc., The: *See—*
Cass, Ann E., 4,046,306, Cl. 229-5.700.
Sopcak, James E.; and Rowland, Walter, 4,045,996, Cl. 73-1.00R.
Continental Oil Company: *See—*
Chapman, William L.; and Newlin, Larry L., 4,047,090, Cl. 363-34.000.
Gordon, Ronnie D.; and Starks, Charles M., 4,046,823, Cl. 260-662.00R.
Control Concepts, Inc.: *See—*
Zeuner, Kenneth W.; and Jarman, Alonzo B., 4,046,399, Cl. 280-420.000.
Control Data Corporation: *See—*
Champagne, Patrick Joseph, 4,046,443, Cl. 339-66.00M.
Conzelmann, Fritz: *See—*
Mitterhummer, Gerhard; Peltz, Hanns-Heinz; Mayer, Heinrich; and Conzelmann, Fritz, 4,045,863, Cl. 29-588.000.
Cook, Kenneth C., to Systron-Donner Corporation. Explosion discharge valve. 4,046,156, Cl. 137-68.00A.
Cook, Robert Alastair, to Mackley Ace Limited. Segment for segmented skirt of a gas cushion vehicle. 4,046,216, Cl. 180-127.000.
Cook, Terence John: *See—*
Burbidge, Bernard Whiting; Cook, Terence John; and Crowson, Roger, 4,046,671, Cl. 208-138.000.
Cook, Thomas E. Solar panel assembly for fluid heating and method. 4,046,133, Cl. 126-270.000.
Cooke, Claude E., Jr.: *See—*
Gruesbeck, Clay; Salathiel, William M.; Muecke, Thomas W.; and Cooke, Claude E., Jr., 4,046,198, Cl. 166-278.000.
Cooke, Robert John: *See—*
Dorey, Howard Anthony; and Cooke, Robert John, 4,047,162, Cl. 364-200.000.
Cooley, Denton A.; Reed, Charles C.; and Sharp, Russell G., to Texas Medical Products, Inc. Method of making a suction wand. 4,045,859, Cl. 29-451.000.
Coope, Robert L.; and Munson, Lowell W., to Stevens Engineering. Torque limiting vise for holding work on a machine tool table. 4,046,364, Cl. 269-244.000.
Copal Company Limited: *See—*
Inoue, Nobuyoshi; and Shimizu, Munetaka, 4,047,211, Cl. 354-258.000.
Yamada, Misao, 4,047,212, Cl. 354-270.000.
Coplan, Myron J.: *See—*
Ashare, Edward; Rulison, Richard N.; Wright, Lawrence T.; and Coplan, Myron J., 4,045,851, Cl. 29-157.00R.
Coppa, Richard J.; and Gold, Nathan, to Polaroid Corporation. Exposure control system having dynamic aperture flash arrangement. 4,047,191, Cl. 354-27.000.
Corbin, Dennis Dale: *See—*
Gabby, John Lester; Corbin, Dennis Dale; and Lowe, Jack Bruner, 4,046,874, Cl. 424-73.000.
Cormia, Robert L.; Trumbly, Terry A.; and Andresen, Sigurd, to Airco, Inc. Method for coating a substrate. 4,046,659, Cl. 204-192.00C.
Cornelius, Gerhard; Marschner, Friedemann; Supp, Emil; and Varlam, Toma, to Metallgesellschaft Aktiengesellschaft. Process for producing energy. 4,045,960, Cl. 60-648.000.
Corning Glass Works: *See—*
Hertl, William; and Odstrchel, Gerald, 4,046,870, Cl. 424-1.000.
Sanford, Leon M.; and Wu, Che-Kuang, 4,046,545, Cl. 65-30.00R.
Zine, Anthony R., Jr., 4,046,699, Cl. 210-516.000.
Corsette, Douglas F. Manual container mounted pump. 4,046,292, Cl. 222-383.000.
Cortez, Raul Chajon. Ellipsograph drafting apparatus. 4,045,875, Cl. 33-30.00D.
Cosco, Robert J.; Lima, Joseph V.; and Soucy, Frank, to GTE Sylvania Incorporated. Flash tube having enclosed trigger wire. 4,047,064, Cl. 313-201.000.
Cosgrove, James F.: *See—*
McCain, William B.; Cosgrove, James F.; and Eaves, Arthur E., 4,046,366, Cl. 270-21.000.
Costas, John P.: *See—*
Bauer, Lowell W.; and Costas, John P., 4,047,172, Cl. 343-17.10R.
Costin, Charles Richard, to Rohm and Haas Company. Quinolizinium resins and monomers and methods for making them. 4,046,766, Cl. 260-290.0HL.
Coulboy, Rene Henri: *See—*
Darnborough, Eric; and Coulboy, Rene Henri, 4,046,192, Cl. 166-.600.
Cox, Karmen D.: *See—*
Scheuer, Paul R.; Cox, Karmen D.; and Sample, Steven B., 4,047,082, Cl. 318-221.00E.
Cox, Robert N.; and Grober, Melvin G., to UMC Industries, Inc. Vendor with door and shelf interlock. 4,046,440, Cl. 312-215.000.
Cram, Phillip J.; and Redford, David A., to Texaco Exploration Canada Ltd. Thermal recovery of hydrocarbons from tar sands. 4,046,195, Cl. 166-272.000.
Crane Co.: *See—*
Goldstein, Melvin, 4,046,686, Cl. 210-23.00H.
Crankshaw, Michael: *See—*
Kucheck, Leo; and Crankshaw, Michael, 4,046,613, Cl. 156-249.000.
Cranor, Dennis A., to ESCO Corporation. Releasable lock. 4,046,327, Cl. 241-197.000.
Crawford, Patrick J. Cross-cut shear for trees. 4,046,179, Cl. 144-34.00E.
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Stucky, Fritz Christoph, 4,045,937, Cl. 52-745.000.
Crimes, Peter B., to Kennecott Copper Corporation. Pyrometallurgical system for liquid-liquid contacting. 4,046,559, Cl. 75-93.00R.
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, to Petro-Tex Chemical Corporation. Oxychlorination of hydrocarbons in the presence of non-halide copper containing catalysts. 4,046,821, Cl. 260-654.00A.
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(alkynyloxy) and (cyanoalkoxy) alkoxyphenyl ureas and their use as herbicides. 4,046,808, Cl. 260-553.00A.
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Kozlowski, John H., 4,046,806, Cl. 260-512.00C.
Crowson, Roger: *See*—
Burbidge, Bernard Whiting; Cook, Terence John; and Crowson, Roger, 4,046,671, Cl. 208-138.000.
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Porreco, Tom, 4,046,407, Cl. 285-133.00R.
Cunningham, Virginia L.; Clovis, James S.; and Hurwitz, Marvin J., to Rohm and Haas Company. Removal of antimony from industrial streams. 4,046,688, Cl. 210-37.00R.
Cuomo, Jerome John: *See*—
Chaudhari, Praveen; Cuomo, Jerome John; and Matthews, John Wauchope, 4,046,618, Cl. 156-603.000.
Curless, Richard W.; and Federico, Armando, to Avco Corporation. Solenoid operated blood pump drive system. 4,046,137, Cl. 128-1.00D.
Curran, Adrian Charles Ward; and Shepherd, Robin Gerald, to John Wyeth & Brother Limited. Phenanthridine derivatives and related compounds. 4,046,895, Cl. 424-258.000.
Cushman, David W.: *See*—
Ondetti, Miguel Angel; and Cushman, David W., 4,046,889, Cl. 424-244.000.
Cwycyshyn, Walter; and Holroyd, Floyd M., to General Motors Corporation. Tool changing apparatus for a multi-axis manipulator. 4,046,263, Cl. 214-1.0BC.
Czerwinski, Watson Peter, to United States of America, Army. Low loss top termination for short monopoles. 4,047,178, Cl. 343-750.000.
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Barry, Louis T.; and Czop, Gordon W., 4,046,085, Cl. 110-12.000.
Dahn, Ursula; Hagenmaier, Hanspaul; Hohne, Helmut; Konig, Wilfried; Scheinpflug, Hans; and Zahner, Hans, to Bayer Aktiengesellschaft. Fungicidally active antibiotic from streptomyces tendae Ettlinger et al. Tu 901. 4,046,881, Cl. 424-181.000.
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Izumo, Masanori; and Nakakita, Sigeru, 4,046,530, Cl. 55-181.000.
D'Alessandro, John A.; and Tuohino, Lawrence A. Ski boot cleat. 4,045,890, Cl. 36-132.000.
Dalley, James Edwin, to Bell Telephone Laboratories, Incorporated. Dial pulse repeating line circuit using miniature line transformer. 4,046,969, Cl. 179-18.0FA.
Dalzell, Charles J. Solid fuel element and process of manufacturing. 4,046,518, Cl. 44-10.00B.
Damm, David A., to Owens-Illinois, Inc. Method and apparatus for measuring the eccentricity of containers. 4,046,258, Cl. 209-111.500.
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Bergmann, Ewald; Bareis, Alfred; Dangelmaier, Karl; and Kottmann, Alfred, 4,046,264, Cl. 214-8.000.
Darnborough, Eric; and Coulboy, Rene Henri, to Seal Petroleum Limited. Method and apparatus for installing a control valve assembly on an underwater well head. 4,046,192, Cl. 166-.600.
Das, Subodh K.; and Milito, Richard A., to Aluminum Company of America. Method for the production of aluminum-silicon alloys. 4,046,558, Cl. 75-68.00A.
Das Gupta, Sankar: *See*—
Fleet, Bernard; and Das Gupta, Sankar, 4,046,663, Cl. 204-280.000.
Fleet, Bernard; and Das Gupta, Sankar, 4,046,664, Cl. 204-280.000.
Data General Corporation: *See*—
Kerllenevich, Natalio, 4,047,201, Cl. 364-200.000.
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Datta, Arthur S.: *See*—
Hershman, Gordon L.; and Datta, Arthur S., 4,046,236, Cl. 192-8.00R.
Daugherty, Thomas Henry; and Stone, Dale Eugene, to Bell Telephone Laboratories, Incorporated. Testing of digital systems. 4,046,964, Cl. 179-15.0BF.
Davies, George Edward; and Foulkes, David Mackie, to Imperial Chemical Industries Limited. Herbicidal compositions of bipyridylium quaternary salts and emetic amounts of s-triazolo pyrimidine derivatives. 4,046,552, Cl. 71-92.000.
Davis, Bryan Terence: *See*—
Elliott, John Scotchford; Davis, Bryan Terence; and Howlett, Richard Martin, 4,046,802, Cl. 560-61.00G.
Davis, Charles W.: *See*—
Salzgeber, Daniel Edwin; Raufeisen, Robert; and Davis, Charles W., 4,046,494, Cl. 417-253.000.
Davis, Curry Beach: *See*—
Schluenz, Robert William; and Davis, Curry Beach, 4,046,748, Cl. 260-78.0UA.
Davis, Michael Ian, to International Business Machines Corporation. Task management apparatus. 4,047,161, Cl. 364-200.000.
Davis, Ralph A.; and Pews, R. Garth, to Dow Chemical Company, The. Photochlorination process for methyl aromatic compounds. 4,046,656, Cl. 204-158.0HA.
Davis, Richard Kent, to General Electric Company. Current limit and overcurrent cut off system. 4,047,235, Cl. 361-100.000.
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Paton, George A.; Nichols, Sterling M.; and Sanders, John H., 4,045,949, Cl. 57-140.0BY.
Day, Clifford K.; and Stringer, James L., to Westinghouse Electric Corporation. Eddy current position indicating apparatus for measuring displacements of core components of a liquid metal nuclear reactor. 4,047,103, Cl. 324-34.00D.
Day, Robert C.: *See*—
Spound, Albert M.; and Day, Robert C., 4,046,421, Cl. 297-232.000.
Dayco Corporation: *See*—
Henderson, Dewey D., 4,046,022, Cl. 74-220.000.
De la Rue Giori S.A.: *See*—
Giori, Gualtiero, 4,045,944, Cl. 53-123.000.
de la Taille, Olivier; Bernard, Armand; and Labadie, Jean-Francois, to Societe Industrielle Bertrand Faure. Child's safety chair. 4,046,420, Cl. 297-216.000.
Debourge, Jean-Claude: *See*—
Lacroix, Guy; and Debourge, Jean-Claude, 4,046,883, Cl. 424-209.000.
Deckard, John I., to General Motors Corporation. Electromagnetic fuel injector. 4,046,112, Cl. 123-32.0JV.
Decker, William Springgall, Sr. Wire roller. 4,046,331, Cl. 242-54.00R.
Deere & Company: *See*—
Head, Glenn Dale, 4,046,069, Cl. 100-255.000.
Rodeghiero, Reno Antonio, 4,046,162, Cl. 137-489.000.
Deinhammer, Wolfgang; Wick, Manfred; and Macri, Antonio, to Consortium fur Elektrochemische Industrie GmbH. Process for preparing methyltin chlorides. 4,046,792, Cl. 260-429.700.
de Leeuw, Jan. Diluting and agitating device. 4,046,515, Cl. 23-259.000.
DeLuca, Carlo J., to Liberty Mutual Insurance Company. Method and apparatus for interfacing to anatomic signal sources. 4,046,141, Cl. 128-2.10R.
Demido, Michael, to General Motors Corporation. Master cylinder with combined reservoir cover, seal and fluid level sensor assembly. 4,047,048, Cl. 307-118.000.
Denham, Keith: *See*—
Alvi, Zia Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, 4,046,053, Cl. 85-72.000.
Dennhoven, Manfred; Kunze, Claus; and Kuehn, Rainhard, to Heimann GmbH. Baggage inspection device. 4,047,035, Cl. 250-355.000.
de Nora, Oronzio; de Nora, Vittorio; and Spaziante, Placido M., to Oronzio de Nora Impianti Elettrochimici S.p.A. Novel electrolysis method and apparatus. 4,046,653, Cl. 204-95.000.
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Deprez, Jacques: *See*—
Becker, Wolf-Jurgen; Deprez, Jacques; and Lehnert, Horst, 4,046,510, Cl. 23-230.00R.
Dermond, Hartley P., to Clark, William H., a part interest. Earth and road roller with oppositely skewed tandem steering drums. 4,046,485, Cl. 404-123.000.
Derrick, Garnet Lloyd: *See*—
Innes, Robert Arthur; Enright, Gregory Preston Michael; and Derrick, Garnet Lloyd, 4,046,931, Cl. 427-428.000.
Derrien, Andre Robert: *See*—
Cazalaa, Jean Michel; Barthe, Alexandre Jean-Paul; and Derrien, Andre Robert, 4,046,157, Cl. 137-74.000.
Desalination Systems, Inc.: *See*—
Bray, Donald Thedore, 4,046,685, Cl. 210-23.00H.
Deserno, Ulrich; and Auracher, Franz, to Siemens Aktiengesellschaft. Method for the production of one-material optical fibers. 4,046,537, Cl. 65-2.000.
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Scheuer, Paul R.; Cox, Karmen D.; and Sample, Steven B., 4,047,082, Cl. 318-221.00E.
Yake, William H., 4,046,261, Cl. 211-41.000.
Detroit Marine Engineering Corporation: *See*—
Horvath, Louis T., 4,046,481, Cl. 403-320.000.
Deutsch Fastener Corporation: *See*—
Gulistan, Bulent, 4,046,054, Cl. 85-74.000.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Brandt, Bernd; Jansen, Peter; and Liesenfeld, Heinz, 4,045,881, Cl. 34-138.000.
Heimberger, Werner; and Schreyer, Gerd, 4,046,862, Cl. 423-383.000.
Reinhardt, Helmut; Gratzfeld, Everhard; and Clausen, Eva, 4,046,861, Cl. 423-367.000.
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Eimers, Erich; Dhein, Rolf; and Wiedermann, Rolf, 4,046,742, Cl. 260-77.5AN.
Diaz, D. Angel Chocarro, to Iberica del Frio S.A. Wall construction. 4,045,927, Cl. 52-127.000.
Dickinson, Harvey Frank, to Ferranti Limited. Pulse width responsive security system. 4,047,107, Cl. 325-37.000.
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; Baum, Allen J.; Cochran, David S.; and Tung, Chung C., to Hewlett-Packard Company. General purpose calculator having factorial capability. 4,047,012, Cl. 235-156.000.
Diehl, John A. Safety means for preventing demounting of low or flat tires from vehicle wheels. 4,046,184, Cl. 152-407.000.
Dieling, Hans; and Schindehutte, Manfred, to Wegmann & Co. Motorized swiveling streetcar trucks. 4,046,080, Cl. 105-133.000.
Diesel Kiki Co., Ltd.: *See*—
Iwasaki, Yuji; and Kashima, Koichi, 4,046,004, Cl. 73-119.00A.
DiForti, Paula Anne; and DiForti, Thomas. Fitted sheet construction. 4,045,832, Cl. 5-334.00C.
DiForti, Thomas: *See*—
DiForti, Paula Anne; and DiForti, Thomas, 4,045,832, Cl. 5-334.00C.
Digital Equipment Corporation: *See*—
Jenkins, Stephen R., 4,047,157, Cl. 364-900.000.
Digoy, Jean-Louis, to U.S. Philips Corporation. Method of manufactur-

ing photo-diodes utilizing sequential diffusion. 4,046,609, Cl. 148-189.000.

Dijet Industrial Co, Ltd.: *See—*
Soga, Yasuyuki, 4,046,517, Cl. 539.5-.

Dijkstra, Edsger W., to Burroughs Corporation. Segment replacement mechanism for varying program window sizes in a data processing system having virtual memory. 4,047,243, Cl. 364-200.000.

Dillon, Peter L. P., to Eastman Kodak Company. Color imaging array. 4,047,203, Cl. 358-44.000.

Di Maio, Anthony E.; and Swier, Willem, to Marson Fastener Corporation. Compressed air rivet setting tool. 4,045,994, Cl. 72-391.000.

Di Marco, Aurelio: *See—*
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and Di Marco, Aurelio, 4,046,878, Cl. 424-180.000.

Director-General of the Agency of Industrial Science and Technology: *See—*
Kobayashi, Kazuo; Ogawa, Ichitaro; Honda, Hidemasa; and Matsushita, Yasuhiro, 4,046,863, Cl. 423-448.000.
Yuki, Nakaji, 4,046,709, Cl. 252-421.000.

DiSabato, Vincent J., to United Technologies Corporation. Combined guide vane and mixer for a gas turbine engine. 4,045,957, Cl. 60-262.000.

Dixon, Bernard, to Dixon International Limited. Fire resistant seals. 4,045,930, Cl. 52-232.000.

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Dixon, Bernard, 4,045,930, Cl. 52-232.000.

Djurickovic, Slobodan M., to Richardson-Merrell Inc. Attenuated TGE virus. 4,046,875, Cl. 424-89.000.

Dlugos, Daniel F.; and Manduley, Flavio M., to Pitney-Bowes, Inc. Clocked digital counting system. 4,047,007, Cl. 235-151.330.

Dmitrievsky, Nikolai Vasilievich: *See—*
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.

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Anderson, Paul T.; and Dobrosielski, Stephen S., 4,047,140, Cl. 337-75.000.

Dr. C. Otto & Comp. G.m.b.H.: *See—*
Ullrich, Hansjurgen, 4,046,641, Cl. 203-39.000.

Dolco Packaging Corporation: *See—*
Congleton, Wayne L., 4,046,256, Cl. 206-497.000.

Dolese Company, The: *See—*
Anderson, Bruce Olen, 4,047,105, Cl. 324-65.00R.

Domges, Gunther: *See—*
Zahn, Wolfgang; Zangenfeind, Helmut; and Domges, Gunther, 4,046,614, Cl. 156-353.000.

Dominion Auto Accessories Limited: *See—*
Nagel, Robert I., 4,047,019, Cl. 240-8.200.

Dorawala, Tansukhlal G.; and Reinhard, Russell R., to Texaco Inc. Steam reforming process. 4,046,869, Cl. 423-652.000.

Dorey, Howard Anthony; and Cooke, Robert John, to Solartron Electronic Group Limited, The. Interface circuit for communicating between two data highways. 4,047,162, Cl. 364-200.000.

Dorman, Linneaus C., to Dow Chemical Company, The. Azide bonding of a protein to a latex. 4,046,723, Cl. 260-8.000.

Dorn, Conrad P.; Jones, Howard; and Jacobus, David P., to Merck & Co., Inc. 5-Mercaptopyridoxine alkanesuifonates and methods of use and pharmaceutical compositions. 4,046,897, Cl. 424-263.000.

Dorn, Conrad P., Jr.: *See—*
Shen, Tsung-Ying; Li, Jorge P.; and Dorn, Conrad P., Jr., 4,046,905, Cl. 424-272.000.

Dougherty, Michael L., to Westinghouse Electric Corporation. Closed electrical apparatus cabinet embodying a vaporization chamber and cabinet top thereof. 4,046,193, Cl. 165-105.000.

Dow Chemical Company, The: *See—*
Davis, Ralph A.; and Pews, R. Garth, 4,046,656, Cl. 204-158.0HA.
Dorman, Linneaus C., 4,046,723, Cl. 260-8.000.
Mass, Robert O.; and Tomkinson, Donald L., 4,046,718, Cl. 260-2.00R.
Newman, Ritchey O., Jr., 4,046,497, Cl. 425-313.000.
Sheahan, James P.; and Putnam, Lowell E., 4,045,934, Cl. 52-514.000.

Dredger, Edward; and Passantino, Thomas. Roller sled. 4,046,392, Cl. 280-8.000.

Dresser Industries, Inc.: *See—*
Marquis, Gerald L., 4,046,764, Cl. 250-262.000.
Mitchell, Howard Earl, 4,046,206, Cl. 175-364.000.

Dreyer, William J.. *See—*
Rembaum, Alan; Yen, Shiao-Ping S.; and Dreyer, William J., 4,046,720, Cl. 260-2.50B.

Dreyfus, Russell Warren, to International Business Machines Corporation. Electron beam pumped gas laser. 4,047,125, Cl. 331-94.5PE.

Driessen, Gerald J.: *See—*
Meng, John C.; and Driessen, Gerald J., 4,046,923, Cl. 426-130.000.

Dubois, Jean-Claude, to Thomson-CSF. Mixture of nematic liquid crystals exhibiting a positive dielectric anisotropy and a wide temperature range. 4,046,708, Cl. 252-299.000.

Dudas, Jozsef: *See—*
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Dufrene, Alex. Tubing plug apparatus for performing down-hole pressure tests. 4,046,006, Cl. 73-151.000.

Duling, Irl N.; and Gates, David S., to Sun Oil Company of Pennsylvania. Traction fluids. 4,046,703, Cl. 252-59.000.

Dulken, Hartmut: *See—*
Glowinski, Wolf; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 4,046,562, Cl. 96-1.50R.

Dumont, Claude: *See—*
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, 4,046,901, Cl. 424-267.000.

Dunderdale, John, to Laporte Industries Limited. Recovery of titanium tetrachloride. 4,046,854, Cl. 423-77.000.

Dungan, Shirley A. Stirrup guard for medical examinations. 4,046,365, Cl. 269-328.000.

Dunham-Bush, Inc.: *See—*
Oliver, James W., Jr., 4,045,977, Cl. 62-324.000.

Dunham, Russell H., to Dunham Tool Company, Inc., The. Dead stop step chuck. 4,046,390, Cl. 279-1.00S.

Dunham Tool Company, Inc., The: *See—*
Dunham, Russell H., 4,046,390, Cl. 279-1.00S.

Dunlap, Clifford E., to W. A. Krueger Co. Stacking method. 4,046,259, Cl. 209-111.70R.

Dunlop Limited: *See—*
Farnsworth, Frank, 4,046,182, Cl. 152-158.000.

Dunwoody, George O. High clearance vehicle hitch. 4,046,398, Cl. 280-415.00R.

Du Pont de Nemours, E. I., and Company: *See—*
Charamella, John Barrie; Long, John Warren; and Stone, Jerry Lloyd, 4,046,476, Cl. 355-77.000.
Cloud, Nathan; and Smith, James Edwin, 4,046,328, Cl. 242-18.00A.
Harmuth, Charles M., 4,046,728, Cl. 260-28.50A.
Higgins, James Francis, 4,046,589, Cl. 106-299.000.
Nazarenko, Nicholas, 4,046,815, Cl. 260-606.50B.
Pye, Donald George, 4,046,567, Cl. 96-27.00R.
Rushmere, John Derek, 4,046,648, Cl. 204-55.00R.
Vaughan, Lawrence G., 4,046,868, Cl. 423-588.000.

Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, to Smith Kline & French Laboratories Limited. Imidazole alkylaminoethylene compounds. 4,046,907, Cl. 424-273.00R.

Durobor S.A.: *See—*
Thyoux, George A., 4,046,550, Cl. 65-229.000.

Duroux, Jean. Process and a device for prospecting the ocean bed by measuring electromagnetic fields. 4,047,098, Cl. 324-6.000.

Durston, John Graham; and Hind, John Richard, to United Kingdom Atomic Energy Authority. Nuclear reactors. 4,046,629, Cl. 176-38.000.

Dyform Concrete (Prestressed) Ltd.: *See—*
Putti, George, 4,046,848, Cl. 264-70.000.

E. R. Squibb & Sons, Inc.: *See—*
Haugwitz, Rudiger D.; and Maurer, Barbara V., 4,046,908, Cl. 424-273.00R.
Ondetti, Miguel Angel; and Cushman, David W., 4,046,889, Cl. 424-244.000.

Eagle Motive Industries, Inc.: *See—*
Fairchild, Jack E.; Maurer, Bruce E.; and Woods, Robert L., 4,046,489, Cl. 416-223.00R.

Easthope, Frederick James: *See—*
Gosling, Alexander Bennett; Ridler, Keith Douglas; Easthope, Frederick James; and Stanwell-Smith, Colin Howard, 4,046,386, Cl. 274-23.00A.

Eastman Kodak Company: *See—*
Carroll, Max L., Jr., 4,046,837, Cl. 260-873.000.
Dillon, Peter L. P., 4,047,203, Cl. 358-44.000.
Frank, Lee Fitzpatrick, 4,047,031, Cl. 250-335.000.
Gysling, Henry J.; and Lelental, Mark, 4,046,569, Cl. 96-48.0PD.
Isett, Lawrence Clair, 4,046,950, Cl. 428-411.000.
Jansen, John R., 4,046,615, Cl. 156-544.000.
Stryjewski, Walter A., 4,046,468, Cl. 355-3.00R.
Terwilliger, James P.; Gingello, Anthony D.; and Wey, Jong-Shinn, 4,046,576, Cl. 96-108.000.
White, William E., 4,046,990, Cl. 219-471.000.

Eaton Corporation: *See—*
Braun, Eugene R.; and Richards, Elmer A., 4,046,032, Cl. 74-865.000.
Broucksou, Robert H., 4,046,024, Cl. 74-493.000.
Larson, Gerald L., 4,046,213, Cl. 180-105.00E.
Nelson, Robert K., 4,046,210, Cl. 180-24.100.
Novak, Thomas A., 4,046,163, Cl. 137-512.300.
Tinholt, Thomas H., 4,046,239, Cl. 192-58.00B.

Eaves, Arthur E.: *See—*
McCain, William B.; Cosgrove, James F.; and Eaves, Arthur E., 4,046,366, Cl. 270-21.000.

Ebara Infilco Kabushiki Kaisha: *See—*
Tsunoda, Shogo; Kataoka, Katsuyuki; and Baba, Toshinori, 4,046,683, Cl. 210-20.000.
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Ebner, Peter R. S., to Itek Corporation. Phototypesetter film feed device. 4,046,372, Cl. 271-273.000.

Economopoulos, Mario, to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie. Processing wire rod. 4,046,599, Cl. 148-12.00B.

Eda, Yasuko: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

Edenfield, Neal M. Saddle support. 4,046,221, Cl. 182-155.000.

Edwards, Eva Irene; Epton, Roger; and Marr, George. Organometallic derivatives of penicillin. 4,046,903, Cl. 424-271.000.

Edwards, Michael S.: *See*—
Rodgers, Billy R.; and Edwards, Michael S., 4,046,690, Cl. 210-75.000.

Edwards, William Howard, to Chloride Group Limited. Method of making electric storage batteries. 4,046,642, Cl. 204-2.100.

Edwin Cooper and Company Limited: *See*—
Elliott, John Scotchford; Davis, Bryan Terence; and Howlett, Richard Martin, 4,046,802, Cl. 560-61.00G.

Eggenmuller, Alfred; Bellan, Heinrich; Scherer, Lorenz; Notter, Eugen; and Wagler, Werner, to Gebruder Eberhard. Apparatus for forming mats or strands of fodder feed material for flat storage thereof. 4,046,068, Cl. 100-65.000.

Ehman, Michael F.; and Austerman, Stanley B., to Rockwell International Corporation. Monocrystalline silicates. 4,046,954, Cl. 428-446.000.

Ehrlinger, Friedrich: *See*—
Ott, Anton; Ehrlinger, Friedrich; Knodler, Dietrich; and Zdansevicius, Roland, 4,046,031, Cl. 74-764.000.

Eichler, Jay H., to Motorola, Inc. Carrying device for portable article. 4,046,295, Cl. 224-5.00H.

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Eimers, Erich; Dhein, Rolf; and Wiedermann, Rolf, to Bayer Aktiengesellschaft. Compositions containing hydroxyl groups and their use for the production of flameproof plastics. 4,046,742, Cl. 260-77.5AN.

Einerhand, Johan Jozef; Colbers, Gerardus Johannes Baptist; Huck, Wilhelmus Martha Andreas; and Geurts, Herman Jozef Johannes Maria, to Hercules Incorporated. Method for the manufacture of a lead chromate-containing pigment having a low acid soluble lead content. 4,046,588, Cl. 106-298.000.

Eisenberg, Arnold J.; and Klink, Jerome P., to Owens-Corning Fiberglas Corporation. Method and apparatus for packaging linear material. 4,046,329, Cl. 242-18.00G.

Elco, Richard A.; Bauer, James A.; and Treese, Willard E., to Westinghouse Electric Corporation. Forward-reverse pulse cycling anodizing and electroplating process. 4,046,649, Cl. 204-58.000.

Electronic Memories & Magnetics Corporation: *See*—
Boice, Michael F., 4,047,164, Cl. 340-174.00M.

Elettronica San Giorgio - ELSAG - S.p.A.: *See*—
Giuliao, Ercole; Paita, Orazio; and Stringa, Luigi, 4,047,152, Cl. 340-146.3AG.

Elfab Corporation: *See*—
Ammon, J. Preston; Weaver, Harry R.; and Rodriguez, Claude, 4,045,868, Cl. 29-629.000.

Eli Lilly and Company: *See*—
Paget, Charles J.; and Wikel, James H., 4,046,770, Cl. 260-305.000.

Ellingson Timber Co.: *See*—
Shoemaker, Philip D.; and McQueary, Hobert O., 4,046,952, Cl. 428-423.000.

Elliott, Edgar H.: *See*—
Metcalfe, Richard T.; Granitsas, George A.; and Elliott, Edgar H., 4,046,596, Cl. 148-2.000.

Elliott, Frank S. Insulative roof apparatus for mobile homes and the like. 4,045,922, Cl. 52-94.000.

Elliott, John Scotchford; Davis, Bryan Terence; and Howlett, Richard Martin, to Edwin Cooper and Company Limited. Process for making a high molecular weight alkylphenoxy substituted aliphatic carboxylic ester. 4,046,802, Cl. 560-61.00G.

Elliott, Pamela: *See*—
Cobb, Malcolm Carnie; and Elliott, Pamela, 4,046,505, Cl. 8-18.00R.

Ellis, John Frederick, to United Kingdom Atomic Energy Authority. Apparatus for separating particulate solids from liquids. 4,046,694, Cl. 210-297.000.

Ellner, Edwin, to Better Packages, Inc. Electronic postage scale. 4,047,006, Cl. 235-151.330.

Embree, Milton Luther; Goldthorp, David Clayton; and O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Integrable line circuit for use with miniature line transformer. 4,046,968, Cl. 179-18.0FA.

Emerson Electric Co.: *See*—
Brenner, George John, Jr., 4,045,971, Cl. 62-140.000.

Emesa Aktiengesellshaft: *See*—
Collepardi, Mario, 4,046,583, Cl. 106-90.000.

EMF, Inc.: *See*—
Griesbach, Melbourne L., 4,046,039, Cl. 83-13.000.

Emhart Corporation: *See*—
Murdoch, Robert N.; Travaglio, Vincent M.; and Magnifico, Michael L., 4,046,083, Cl. 108-107.000.

Emmett, John Colin: *See*—
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,046,907, Cl. 424-273.00R.

Engineered Systems, Inc.: *See*—
Salley, Ernest J., 4,046,995, Cl. 235-61.60R.

Enright, Gregory Preston Michael: *See*—
Innes, Robert Arthur; Enright, Gregory Preston Michael; and Derrick, Garnet Lloyd, 4,046,931, Cl. 427-428.000.

Ensmann, Burt; Nielsen, Edwin A.; Snyder, Edward, III; and Ventura, Frank D., to Ideal Toy Corporation. Powered vehicle transport vehicle and track having a well therein. 4,045,908, Cl. 46-204.000.

Enviro-Blast International: *See*—
Gilbert, Neal J.; and Horton, Edward L., 4,045,915, Cl. 51-427.000.

Epton, Roger: *See*—
Edwards, Eva Irene; Epton, Roger; and Marr, George, 4,046,903, Cl. 424-271.000.

Erhardt, Manfred: *See*—
Loos, Herbert; Seitz, Max; and Erhardt, Manfred, 4,045,917, Cl. 51-123.00G.

Erickson, Fred William; and Nakahara, Roy Hiroshi, to Litton Systems, Inc. Drive circuit with constant current output. 4,047,049, Cl. 307-157.000.

Ernst Leitz GmbH: *See*—
Bletz, Walter; and Holle, Werner, 4,047,189, Cl. 354-23.00D.
Holle, Werner H., 4,047,022, Cl. 250-201.000.

Ernsthausen, Roger E., to Owens-Illinois, Inc. Gas dielectric overcoat for panel. 4,047,065, Cl. 313-201.000.

ESCO Corporation: *See*—
Cranor, Dennis A., 4,046,327, Cl. 241-197.000.

Espig, Winfried, to Prontor-Werk, Alfred Gauthier GmbH. Camera with an electronic timer and including an electro-mechanical delayed action stop for the shutter drive. 4,047,210, Cl. 354-238.000.

Esquire, Inc.: *See*—
McNamara, Albert C., Jr., 4,047,076, Cl. 315-88.000.

Essex Group, Inc.: *See*—
Furtah, Reginald D., Jr., 4,046,241, Cl. 192-150.000.
Yorks, Robert G.; and Junker, David W., 4,047,233, Cl. 361-88.000.

Estradier, Francoise: *See*—
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,046,786, Cl. 260-396.00N.

Eszakmagyarorszagi Vegyimuvek: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Etat Francais: *See*—
Le Gall, Jean C., 4,046,176, Cl. 140-92.100.

Eto, Yoshizumi: *See*—
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,046,455, Cl. 350-150.000.

Etud: *See*—
Tanguy, Pierre, 4,046,924, Cl. 426-502.000.

Europe Container Terminus B.V.: *See*—
Wormmeester, Gerhardus J.; and Rijsenbrij, Joannes C., 4,046,265, Cl. 214-14.000.

Evans, William J., to P. R. Mallory & Co., Inc. Electronic component and method. 4,045,862, Cl. 29-570.000.

Everitt, Delmar K.: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,046,380, Cl. 273-119.00R.

Excel Industries, Inc.: *See*—
Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., 4,046,200, Cl. 172-14.000.

Exxon Production Research Company: *See*—
Gruesbeck, Clay; Salathiel, William M.; Muecke, Thomas W.; and Cooke, Claude E., Jr., 4,046,198, Cl. 166-278.000.
Gruesbeck, Clay, Jr.; Penberthy, Walter L., Jr.; and Muecke, Thomas W., 4,046,197, Cl. 166-305.00R.
Neath, Robert Arthur, 4,046,191, Cl. 166-.500.

Exxon Research and Engineering Company: *See*—
Kalina, Theodore; and Moore, Roger E., 4,046,523, Cl. 48-197.00R.
Paynter, John D.; Fuqua, Beverly B.; and Cecil, Richard R., 4,046,673, Cl. 208-140.000.
Wittman, Robert H.; and Howell, William G., 4,046,301, Cl. 228-108.000.

Fairchild Camera and Instrument Corporation: *See*—
Alexander, Wilson E., 4,047,127, Cl. 332-31.00T.
McCaffrey, Terence; Raza, Hassan; and Williams, Bruce C., 4,047,217, Cl. 357-34.000.

Fairchild, Jack E.; Maurer, Bruce E.; and Woods, Robert L., to Eagle Motive Industries, Inc. Aerodynamic fan blade. 4,046,489, Cl. 416-223.00R.

Falk, Robert A.: *See*—
Mueller, Karl Friedrich; and Falk, Robert A.. 4,046,944, Cl. 428-262.000.

Falk, Roland: *See*—
Hartmann, Hans-Joerg; Falk, Roland; Gawlik, Peter; Balz, Werner; Uhl, Karl; Schaefer, Dieter; and Motz, Herbert, 4,046,932, Cl. 428-64.000.

Fanciullo, Salvatore, to United Technologies Corporation. Process for controlling the output of a selective oxidizer. 4,046,956, Cl. 429-20.000.

Farcasiu, Malvina; and Whitehurst, Darrell Duayne, to Mobil Oil Corporation. Double solvent extraction of organic constituents from tar sands. 4,046,668, Cl. 208-11.0LE.

Faren, Jack. Dampening guard for TV antennas. 4,047,182, Cl. 343-904.000.

Farnsworth, Frank, to Dunlop Limited. Safety tire and wheel assemblies. 4,046,182, Cl. 152-158.000.

Farrell, Eugene A., to Frink Sno-Plows. Hydraulically operated front and rear wing hangers for snow plows. 4,045,892, Cl. 37-50.000.

Farris, Edward T.: *See—*
Barsa, John J.; Farris, Edward T.; and Lagow, Richard J., 4,046,858, Cl. 423-305.000.

Fasciati, Alfred: *See—*
Zweifel, Hans Heini; Buehler, Arthur; and Fasciati, Alfred, 4,046,507, Cl. 8-79.000.

Federal Pacific Electric Co.: *See—*
MacPhee, Colin A. A., 4,047,079, Cl. 361-45.000.

Federico, Armando: *See—*
Curless, Richard W.; and Federico, Armando, 4,046,137, Cl. 128-1.00D.

Feeney, George W., to Goodyear Tire & Rubber Company, The. Adhesive compositions of a block copolymer and tackifying resin. 4,046,838, Cl. 260-876.00B.

Feess, Erich; and Maier, Hans-Peter, to Hoechst Aktiengesellschaft. Process and device for the continuous dyeing of texile webs of synthetic or mostly synthetic fibre materials. 4,046,506, Cl. 8-21.00R.

Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased (by Naret, Avgustina Alexandrovna, administrator). Automated planer. 4,045,893, Cl. 37-108.00A.

Fekete, Thomas M.; and Start, John F., to FMC Corporation. Continuous process for the production of phosphonitrilic chlorides. 4,046,857, Cl. 423-300.000.

Fender, C. Leo. String post for musical instruments. 4,046,050, Cl. 84-304.000.

Ferranti Limited: *See—*
Dickinson, Harvey Frank, 4,047,107, Cl. 325-37.000.
Harley, David Murray, 4,046,441, Cl. 339-8.00R.

Ferro, Armand P.; and Kurz, Bruno F., deceased (by Kurz-Beerli, Elizabeth, executrix, also known as Elizabeth Kurz Chinoy), to General Electric Company. Bipolar transistor structure having low saturation resistance. 4,047,220, Cl. 357-48.000.

Ferro Corporation: *See—*
Veeder, Richard K., 4,046,845, Cl. 261-122.000.

FIAT Societa per Azioni: *See—*
Formia, Antonio, 4,046,128, Cl. 123-195.00C.

Fickel, R. Gene, to UOP Inc. Method for controlling heat input to the reboiler section of a distillation column. 4,046,638, Cl. 203-1.000.

Fidelity Electric Company, Incorporated: *See—*
Hofmann, Charles J.; and Suess, Frederick F., 4,046,432, Cl. 308-189.00R.

Fiebelkorn, Klaus Dieter; and Spitzer, Gunther, to Siemens Aktiengesellschaft. Plug connection for optical fibers. 4,046,453, Cl. 350-96.00C.

Fields, Ellis K.: *See—*
Puskas, Imre; and Fields, Ellis K., 4,046,779, Cl. 260-346.220.

Fields, Larry D.: *See—*
Morris, Earl L.; and Fields, Larry D., 4,045,827, Cl. 4-3.000.

Fierens, Marcel Robert; and Heylen, Renaat Frans, to AGFA-GEVAERT N.V. Hardening fixer for photographic silver halide material. 4,046,570, Cl. 96-61.00R.

Fierro Esponja, S.A.: *See—*
Celada, Juan; and MacKay, Patrick W., 4,046,556, Cl. 75-35.000.

Fike, Don G. Marine vessel scrubbing device and method. 4,046,095, Cl. 114-222.000.

Filper Corporation: *See—*
White, Thomas J.; Spence, Henry L.; and McClelland, Etheridge R., 4,045,940, Cl. 53-26.000.

Finan, Michael Anthony: *See—*
Smith, Malcolm John; Miles, Peter; Richardson, Norman; and Finan, Michael Anthony, 4,046,707, Cl. 252-180.000.

Finkemeyer, Karl-Friedrich; Roehr, Kuno M.; and Sonntag, Guenther, to International Business Machines Corporation. Microprogrammed data processing system. 4,047,244, Cl. 364-200.000.

Firestone Tire & Rubber Company, The: *See—*
Schonfeld, Steven Edward, 4,046,743, Cl. 260-77.5AB.

Fisher, Michael H.; and Wu, Mu Tsu, to Merck & Co., Inc. Substituted 2-phenylhydrazino and 2-phenylazo thiazolines. 4,046,753, Cl. 260-158.000.

Fisher Scientific Company: *See—*
Louder, Nevitt M., 4,046,290, Cl. 222-267.000.

Flam, Fred; and Hart, Dennis L., to Under Sea Industries, Inc. Power deflator mechanism for scuba buoyancy vests. 4,045,835, Cl. 9-313.000.

Flantua, Gysbertus, to Bonar & Bemis Ltd. Method and apparatus for casing flexible containers. 4,045,941, Cl. 53-35.000.

Fleet, Bernard; and Das Gupta, Sankar, to 308489 Ontario Limited. Carbon fiber electrode. 4,046,663, Cl. 204-280.000.

Fleet, Bernard; and Das Gupta, Sankar, to 308489 Ontario Limited. Metallic filament electrode. 4,046,664, Cl. 204-280.000.

Fleetwood, Charles M., Jr.: *See—*
Rice, Stephen H.; Spencer, Rodney S.; and Fleetwood, Charles M., Jr., 4,046,619, Cl. 156-645.000.

Fleischman, George L.: *See—*
Marcus, Bruce D.; and Fleischman, George L., 4,046,190, Cl. 165-105.000.

Flewelling, Harry J. Adjustable wrench. 4,046,034, Cl. 81-165.000.

Flinchbaugh, Henry K., to Flinchbaugh-Murray Corporation. Elevator system for transporting wheelchair patients. 4,046,226, Cl. 187-12.000.

Flinchbaugh-Murray Corporation: *See—*
Flinchbaugh, Henry K., 4,046,226, Cl. 187-12.000.

Flora, Raymond A.: *See—*
Budinski, John A.; and Flora, Raymond A., 4,046,020, Cl. 74-70.000.

Flow Pharmaceuticals, Inc.: *See—*
Krezanoski, Joseph Zenon, 4,046,706, Cl. 252-106.000.

FMC Corporation: *See—*
Fekete, Thomas M.; and Start, John F., 4,046,857, Cl. 423-300.000.
Henle, Richard G.; Merkert, Clifton S.; and Thomas, David C., 4,046,023, Cl. 74-242.800.
Hill, Jerry M., 4,046,017, Cl. 73-462.000.

Fogarassy, Elemer: *See—*
Tucsok, Steve; and Fogarassy, Elemer, 4,046,325, Cl. 241-73.000.

Fogleman, Floyd F.: *See—*
Kline, Richard L.; and Fogleman, Floyd F., 4,046,338, Cl. 244-213.000.

Forano Limitee: *See—*
Payeur, Marcel, 4,046,042, Cl. 83-418.000.

Ford, Gregory A., to Phillips Petroleum Company. Temperature control system. 4,045,998, Cl. 73-23.100.

Ford Motor Company: *See—*
Allison, William D., 4,046,402, Cl. 280-674.000.

Formia, Antonio, to FIAT Societa per Azioni. Cylinder heads for internal combustion compression-ignition engines. 4,046,128, Cl. 123-195.00C.

Forster, Herbert: *See—*
Landgraf, Helmut; Forster, Herbert; and Meurer, Karl, 4,046,603, Cl. 148-144.000.

Fory, Werner: *See—*
Baccini, Peter; and Fory, Werner, 4,046,793, Cl. 260-439.00R.

Foster Grant Co., Inc.: *See—*
Papetti, Stelvio, 4,046,839, Cl. 260-880.00R.

Foster, Robert; Preston, Roger Edwin; and Robinson, Graham Ernest, to Imperial Chemical Industries Limited. Phosphonates containing protected ketone group. 4,046,841, Cl. 260-923.000.

Foster, Samuel L.: *See—*
Waterman, Michael W.; and Foster, Samuel L., 4,047,239, Cl. 361-270.000.

Foulkes, David Mackie: *See—*
Davies, George Edward; and Foulkes, David Mackie, 4,046,552, Cl. 71-92.000.

Fournier, Joseph T., Jr.: *See—*
Uhlmann, Donald R.; Snitzer, Elias; Hovey, Richard J.; Chu, Nori Y. C.; and Fournier, Joseph T., Jr., 4,046,586, Cl. 106-194.000.

Fowler, John T., to Laitram Corporation, The. Digital compass and gimbal assembly for two conductor connection. 4,047,168, Cl. 340-310.00R.

Franck, Gunter: *See—*
Busch, Lothar; and Franck, Gunter, 4,047,071, Cl. 313-490.000.

Francombe, Maurice H.; and Wu, Shu-Yau, to Westinghouse Electric Corporation. Electrostatically bonded dielectric-on-semiconductor device, and a method of making the same. 4,047,214, Cl. 357-23.000.

Frank, Lee Fitzpatrick, to Eastman Kodak Company. Apparatus for obtaining radiographs. 4,047,031, Cl. 250-335.000.

Frank, Thomas E.; Gum, Roy E.; Shoupe, J. T.; and Warner, Dennis L., to Graphic Enterprises. Photocopy machine having photoelectric paper cut-off sensor. 4,046,469, Cl. 355-13.000.

Franken, Adrianus Jacobus Jozef: *See—*
Smulders, Hendricus Franciscus Gerardus; and Franken, Adrianus Jacobus Jozef, 4,046,458, Cl. 350-178.000.

Frankshun, Robert A.: *See—*
Jones, Howard; and Frankshun, Robert A., 4,046,760, Cl. 260-239.55R.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See—*
Theurer, Josef; and Brunninger, Manfred, 4,046,077, Cl. 104-2.000.
Theurer, Josef, 4,046,078, Cl. 104-7.00R.
Theurer, Josef, 4,046,079, Cl. 104-7.00R.

Fraser, David Bruce, to Bell Telephone Laboratories, Incorporated. Sputter coating with charged particle flux control. 4,046,660, Cl. 204-192.00C.

Frech, Kenneth J.: *See—*
Nowak, Edward N.; and Frech, Kenneth J., 4,046,832, Cl. 260-683.00D.

Freche, John C.; and Waters, William J., to United States of America, National Aeronautics and Space Administration. Nickel base alloy. 4,046,560, Cl. 75-170.000.

Frechette, Kenneth R., to Xerox Corporation. Carriage stabilization means for a serial printer. 4,046,245, Cl. 197-60.000.

Fred Whitaker Company: *See—*
Whitaker, Ralph, 4,045,848, Cl. 28-218.000.

Frederick, Carlton L.: *See—*
Witriol, Norman M.; and Frederick, Carlton L., 4,047,001, Cl. 235-151.300.

Freedman, Robert Nathan, to Natural Science Industries, Ltd. Abrading and polishing tumbler apparatus. 4,045,918, Cl. 51-164.000.

French, Barry T., to Rockwell International Corporation. High speed low capacitance charge coupled device in silicon-sapphire. 4,047,216, Cl. 357-24.000.

Frensch, Heinz; Albrecht, Konrad; and Hartel, Kurt, to Hoechst Aktiengesellschaft. Salts of alkyl 2-benzimidazole-carbamate. 4,046,906, Cl. 424-273.00R.

Frese, Albert: *See—*
Baxmann, Fritz; Frese, Albert; Roben, Hermann; and Wolpers, Jurgen, 4,046,945, Cl. 428-282.000.

Fried, John H.: *See—*
Kluge, Arthur F.; Untch, Karl G.; and Fried, John H., 4,046,801, Cl. 560-121.000.

Frierdich, Richard D.: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,046,380, Cl. 273-119.00R.

Frink Sno-Plows: *See—*
Farrell, Eugene A., 4,045,892, Cl. 37-50.000.

Fritz, Alan J., to Itasca Magnetics, Inc. Permanent magnet high intensity separator. 4,046,680, Cl. 209-214.000.

Fritz, John E., Jr.: *See—*
Sekhon, Kalwant S.; Nelson, Lloyd A.; and Fritz, John E., Jr., 4,047,198, Cl. 357-82.000.

Fritz, Kurt; and Beckmann, Georg, to Waagner-Biro Aktiengesellschaft. Steam generators. 4,046,110, Cl. 122-32.000.

Frolich, Martin: *See—*
Moller, Erwin; Bausch, Franz Hubert; and Frolich, Martin, 4,045,945, Cl. 53-167.000.

Fronek, Donald K.: *See—*
Lane, Richard A.; and Fronek, Donald K., 4,047,114, Cl. 328-140.000.

Fruehauf Corporation: *See—*
Chieger, George; Schwartz, Robert B.; and Banerjea, Tara N., 4,046,278, Cl. 220-1.500.

Frye, Robert Charles; Fu, Horng-Sen; and Tasch, Al F., Jr., to Texas Instruments Incorporated. Uniphase charge coupled devices. 4,047,215, Cl. 357-24.000.

Fu, Horng-Sen: *See—*
Frye, Robert Charles; Fu, Horng-Sen; and Tasch, Al F., Jr., 4,047,215, Cl. 357-24.000.

Fugit, Brian Blair, to Motorola, Inc. Transponder. 4,047,171, Cl. 343-6.80R.

Fuji Kogyo Co., Ltd.: *See—*
Ohmura, Ryuichi, 4,045,902, Cl. 43-22.000.

Fuji Photo Film Co., Ltd.: *See—*
Hinata, Masanao; Mihara, Yuji; Sato, Akira; and Ikeda, Tadashi, 4,046,572, Cl. 96-69.000.
Inouye, Kozo; Nakamura, Kotaro; Yokota, Yukio; Nakazyo, Kiyoshi; and Okumura, Akio, 4,046,573, Cl. 96-74.000.
Tada, Sugihiko; Nakai, Setsuo; Irie, Kazuo; Saito, Hirokazu; and Suzuki, Hideaki, 4,046,154, Cl. 134-65.000.

Fujikawa, Kanichi: *See—*
Takahashi, Ryohei; Fujikawa, Kanichi; Yokomichi, Isao; Tsujii, Yasuhiro; and Sakashita, Nobuyuki, 4,046,553, Cl. 71-94.000.

Fujimori, Tokuzo. Method of producing hard foamed materials. 4,046,846, Cl. 264-45.300.

Fujimoto, Shoji: *See—*
Inoue, Yasukazu; and Fujimoto, Shoji, 4,046,607, Cl. 148-187.000.

Fujino, Takashi: *See—*
Yagi, Kouichi; Yamanaka, Makoto; and Fujino, Takashi, 4,046,705, Cl. 252-99.000.

Fujita, Tatsu: *See—*
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.

Fukuda, Teruo; and Otomo, Tetuo, to Hitachi, Ltd. Transformers of large capacity for ultra-high voltages. 4,047,139, Cl. 336-150.000.

Fukuma, Nobuo; and Matsubara, Hideyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Cam-controlled grinding machine. 4,045,920, Cl. 51-165.880.

Fukushima, Osamu, to Kuraray Co., Ltd. Process for preparation of colored suede sheet materials. 4,046,504, Cl. 8-17.000.

Fundacion de Estudios Farmaco-Biologicos: *See—*
Cebrian, Gregorio Ramon, 4,046,918, Cl. 424-331.000.
Cebrian, Gregorio Ramon, 4,046,919, Cl. 424-338.000.

Fuqua, Beverly B.: *See—*
Paynter, John D.; Fuqua, Beverly B.; and Cecil, Richard R., 4,046,673, Cl. 208-140.000.

Furr, Robert L., to Hayes, Robert I., Jr., a part interest. Table soccer playing figure. 4,046,378, Cl. 273-85.00D.

Furtah, Reginald D., Jr., to Essex Group, Inc. Over-ride mechanism for screw drive actuator. 4,046,241, Cl. 192-150.000.

Futaba Denshi Kogyo Kabushiki Kaisha: *See—*
Kishino, Takao; Morimoto, Kiyoshi; and Utamura, Yukihiko, 4,047,072, Cl. 313-496.000.
Kishino, Takao, 4,047,073, Cl. 313-497.000.
Kishino, Takao; Yamaguchi, Nobuo; and Utamura, Yukihiko, 4,047,074, Cl. 313-497.000.

G. D. Searle & Co. Limited: *See—*
Rowland, George Ferdinand, 4,046,722, Cl. 260-6.000.

Gabby, John Lester; Corbin, Dennis Dale; and Lowe, Jack Bruner, to Mead Johnson & Company. Soapless shave composition. 4,046,874, Cl. 424-73.000.

Gable, Ronald L.: *See—*
Gardner, Alexander C.; and Gable, Ronald L., 4,046,175, Cl. 140-92.100.

Gabliks, Maigonis: *See—*
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, 4,046,821, Cl. 260-654.00A.

Gabriele, Leonard A., to Lear Siegler, Inc. Gear rolling equipment. 4,045,987, Cl. 72-84.000.

GAF Corporation: *See—*
Mertz, John R., 4,046,571, Cl. 96-66.0HD.

Gainer, John L., to University of Virginia, The. Method of treating hypertension. 4,046,880, Cl. 424-180.000.

Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,046,907, Cl. 424-273.00R.

Ganter, Wolfgang; and Ginter, Albert, to Gebruder Junghans GmbH. Safety mechanism for a watertight watch having a piezo electric buzzer. 4,045,954, Cl. 58-38.00R.

Garagnon, Gary B., to Ampex Corporation. High stability digital head servo for video recorders. 4,047,231, Cl. 360-36.000.

Garbuzov, Zalman Eremeevich: *See—*
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.

Gardiner, David Stirling, to General Foods Ltd. Non-dairy creamer compositions. 4,046,926, Cl. 426-613.000.

Gardner, Alexander C.; and Gable, Ronald L., to Machine Products Corporation. Precision level coil winding apparatus. 4,046,175, Cl. 140-92.100.

Gardner, Beth Ann: *See—*
Helsley, Grover C.; Strupczewski, Joseph T.; and Gardner, Beth Ann, 4,046,900, Cl. 424-267.000.

Gardner, Charles Stanley; and Molloy, Denis Edward, to Rolls-Royce (1971) Limited. Electro-chemical machine tools. 4,046,662, Cl. 204-275.000.

Gardocki, Joseph Francis: *See—*
Rasmussen, Chris Royce; Gardocki, Joseph Francis; and Plampin, James Nelson, 4,046,909, Cl. 424-274.000.

Garner, Robert; and Petitpierre, Jean-Claude, to Ciba-Geigy Corporation. Heterocyclic substituted lactone compounds. 4,046,776, Cl. 260-326.14R.

Garrett Corporation, The: *See—*
Carrie, George W., 4,046,056, Cl. 89-12.000.
Stokes, Richard F., 4,046,061, Cl. 91-459.000.

Garrison, Judd F., to John Thomas Batts, Inc. Detachable bar for garment hanger. 4,046,293, Cl. 223-88.000.

Gates, David S.: *See—*
Duling, Irl N.; and Gates, David S., 4,046,703, Cl. 252-59.000.

Gates, Gerald Alan, to International Business Machines Corporation. Semiconductor wafer alignment apparatus. 4,046,985, Cl. 219-121.00L.

Gates, Victor Genez. Cohesive display board. 4,045,897, Cl. 40-125.00A.

Gawlik, Peter: *See—*
Hartmann, Hans-Joerg; Falk, Roland; Gawlik, Peter; Balz, Werner; Uhl, Karl; Schaefer, Dieter; and Motz, Herbert, 4,046,932, Cl. 428-64.000.

Gebruder Eberhard: *See—*
Eggenmuller, Alfred; Bellan, Heinrich; Scherer, Lorenz; Notter, Eugen; and Wagler, Werner, 4,046,068, Cl. 100-65.000.

Gebruder Giulini GmbH: *See—*
Schepers, Bernhard; Bayer, Gerhard; Urmann, Ernst; and Schanz, Klaus, 4,046,855, Cl. 423-130.000.

Gebruder Junghans GmbH: *See—*
Ganter, Wolfgang; and Ginter, Albert, 4,045,954, Cl. 58-38.00R.

Gele, Pierre J.: *See—*
Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J., 4,046,120, Cl. 123-120.000.

Gellert, Jobst Ulrich. Injection molding filter assembly. 4,046,359, Cl. 259-193.000.

Gendlina, Ljudmila Ivanovna: *See—*
Kreimer, Vladimir Isakovich; Tishkov, Anatoly Yakovlevich; Grigoriev, Vitaly Markovich; Gendlina, Ljudmila Ivanovna; and Zimonin, Leonid Vasilievich, 4,046,249, Cl. 198-758.000.

General Bathroom Products Corporation: *See—*
Palka, James J., 4,047,016, Cl. 240-4.000.

General Cable Corporation: *See—*
Brorein, William J., 4,046,444, Cl. 339-91.00R.

General Electric Company: *See—*
Adlon, Bruce E.; Villiers, Walter H.; and Tarnoff, Sherwin S., 4,045,896, Cl. 40-106.100.
Bauer, Lowell W.; and Costas, John P., 4,047,172, Cl. 343-17.10R.
Blount, Richard, 4,047,015, Cl. 240-1.300.
Challen, Richard F., 4,047,009, Cl. 235-152.000.
Clausen, Edward M., 4,047,067, Cl. 313-221.000.
Davis, Richard Kent, 4,047,235, Cl. 361-100.000.
Ferro, Armand P.; and Kurz, Bruno F., deceased, 4,047,220, Cl. 357-48.000.
Houston, John M., 4,047,039, Cl. 250-385.000.
Houston, John M., 4,047,040, Cl. 250-385.000.
Houston, John M., 4,047,041, Cl. 250-385.000.
Kresge, James S., 4,046,847, Cl. 264-61.000.
Lever, Ray Clarence; and Wilkus, Edward Vincent, 4,046,849, Cl. 264-174.000.
McCarty, William J., 4,045,974, Cl. 62-196.00B.
McCarty, William J., 4,045,975, Cl. 62-196.00B.
McHugh, James D., 4,046,223, Cl. 184-6.110.
Murphy, Bartholomew D.; and Gonyea, David C., 4,046,002, Cl. 73-116.000.
Plunkett, Allan Barr, 4,047,083, Cl. 318-231.000.
Quinlivan, Richard Paul, 4,046,341, Cl. 244-181.000.
Steigerwald, Robert L., 4,047,138, Cl. 336-100.000.
Temple, Victor A. K., 4,047,219, Cl. 357-38.000.

Toft, Kaj; and Busby, Llewellyn D., 4,045,894, Cl. 38-77.830.
Torossian, Kevork A.; and Kohn, Leo S., 4,046,938, Cl. 428-285.000.

General Electric Company Limited, The: *See—*
Reece, Albert Benjamin John; and Walkden, Anthony John, 4,047,063, Cl. 310-232.000.

General Foam Plastics Corporation: *See—*
Chase, Ascher, 4,046,379, Cl. 273-95.0AA.

General Foods Ltd.: *See—*
Gardiner, David Stirling, 4,046,926, Cl. 426-613.000.

General Motors Corporation: *See—*
Barr, Paul N., 4,047,111, Cl. 325-315.000.
Baynes, Gene P.; and Brooks, Frank W., 4,046,427, Cl. 303-115.000.
Benasutti, Louis D.; Neubauer, Jerry L.; and Meyer, Ronald E., 4,046,438, Cl. 312-138.00A.
Brown, William B., 4,046,658, Cl. 204-181.000.
Budinski, John A.; and Flora, Raymond A., 4,046,020, Cl. 74-70.000.
Cwycyshyn, Walter; and Holroyd, Floyd M., 4,046,263, Cl. 214-1.0BC.
Deckard, John I., 4,046,112, Cl. 123-32.0JV.
Demido, Michael, 4,047,048, Cl. 307-118.000.
Hamparian, Nshan; and Bandrowski, Michael, Jr., 4,046,114, Cl. 123-41.760.
Hansen, Kai H., 4,046,212, Cl. 180-44.00R.
Himmler, Dennis W., 4,047,088, Cl. 320-6.000.
Kellogg, George Edward, 4,046,232, Cl. 188-73.100.
Klees, Gerard T.; Meacham, Robert A.; Ruby, Harry M.; and Sich, Edward, 4,046,415, Cl. 296-35.00R.
Knape, Richard S.; and Straub, Robert D., 4,046,322, Cl. 239-533.700.
Matter, Robert C., 4,046,062, Cl. 29-623.100.
Prikkel, John, III, 4,046,940, Cl. 428-313.000.
Richard, Raymond L., Jr., 4,046,411, Cl. 293-88.000.
Yurtin, John A., 4,046,450, Cl. 339-217.00S.

General Signal Corporation: *See—*
Montagno, William J.; and MacIntyre, Allan L., 4,046,352, Cl. 254-29.00R.

Gerwick, Benjamin C., Jr., to Kajima Corporation. Offshore platform and method for its installation. 4,045,968, Cl. 61-86.000.

Geurts, Herman Jozef Johannes Maria: *See—*
Einerhand, Johan Jozef; Colbers, Gerardus Johannes Baptist; Huck, Wilhelmus Martha Andreas; and Geurts, Herman Jozef Johannes Maria, 4,046,588, Cl. 106-298.000.

Gewerkschaft Eisenhutte Westfalia: *See—*
Becker, Kunibert; and Weirich, Walter, 4,046,060, Cl. 91-414.000.
Grisebach, Hans Theodor, 4,046,058, Cl. 91-32.000.

Geyer, Manvel A.: *See—*
Kernick, Andress; and Geyer, Manvel A., 4,046,229, Cl. 187-29.00R.

Gibbs, Louis L. Easily erected roof structure for modular buildings. 4,045,926, Cl. 52-127.000.

Gilbert, Neal J.; and Horton, Edward L., to Enviro-Blast International. Portable sandblaster. 4,045,915, Cl. 51-427.000.

Gildemeister Corpoplast GmbH: *See—*
Appel, Adolf; and Reymann, Wolfgang, 4,046,498, Cl. 425-526.000.

Gim Metal Products: *See—*
Winant, Arnold Francis, 4,047,021, Cl. 240-78.00E.

Gingello, Anthony D.: *See—*
Terwilliger, James P.; Gingello, Anthony D.; and Wey, Jong-Shinn, 4,046,576, Cl. 96-108.000.

Ginter, Albert: *See—*
Ganter, Wolfgang; and Ginter, Albert, 4,045,954, Cl. 58-38.00R.

Giori, Gualtiero, to De la Rue Giori S.A. Processing of sheets of printed security papers into bundles and packets. 4,045,944, Cl. 53-123.000.

Gipson, Robert Malone, to Texaco Development Corporation. Boride catalyst for epoxidizing olefinic compounds. 4,046,784, Cl. 260-348.290.

Girling Limited: *See—*
Klassen, Horst Willi, 4,046,233, Cl. 188-73.300.

Gist-Brocades N.V.: *See—*
Verweij, Jan; and Tan, Hong Sheng, 4,046,761, Cl. 544-17.000.

Giuliao, Ercole; Paita, Orazio; and Stringa, Luigi, to Elettronica San Giorgio - ELSAG - S.p.A. Electronic character-reading system. 4,047,152, Cl. 340-146.3AG.

Givaudan Corporation: *See—*
Naegeli, Peter, 4,046,716, Cl. 252-522.000.

Glaum, Gerald Vernon: *See—*
Subramanian, Kohur Nagaraja; and Glaum, Gerald Vernon, 4,046,851, Cl. 423-41.000.

Glenn, Edwin E., Jr., to Mobil Oil Corporation. Method for distinguishing between single-phase gas and single-phase liquid leaks in well casings. 4,046,220, Cl. 181-105.000.

Glenn, Robert M. Automobile polishing apparatus. 4,045,836, Cl. 15-4.000.

Glover, Nolan S., to Harsco Corporation. Scum skimmer apparatus. 4,046,693, Cl. 210-195.00S.

Glover, Nolan S., to Harsco Corporation. Sludge scraper mechanism. 4,046,700, Cl. 210-523.000.

Glowinski, Wolf; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, to Licentia Patent-Verwaltungs-G.m.b.H. Electrophotographic recording material and its method of manufacture. 4,046,562, Cl. 96-1.50R.

Goda, George. Device for pipetting and/or diluting. 4,046,291, Cl. 222-309.000.

Goetz, Philip J., to Pen Kem, Inc. Microelectrophoresis apparatus. 4,046,667, Cl. 204-299.00R.

Goetzke, Siegfried: *See—*
Jakob, Gert; and Goetzke, Siegfried, 4,047,242, Cl. 361-389.000.

Goffredo, Daniel L.; and Shakley, Conrad Dale, to Chemcut Corporation. Connecting and alignment means for modular chemical treatment system. 4,046,248, Cl. 198-583.000.

Gold, James J., to American Optical Corporation. Variable interlace display. 4,047,204, Cl. 358-93.000.

Gold, Nathan: *See—*
Coppa, Richard J.; and Gold, Nathan, 4,047,191, Cl. 354-27.000.

Goldfarb, Adolph E.; and Benkoe, Erwin. Play device for suspending and moving a floatable object relative to movable areas. 4,045,906, Cl. 46-44.000.

Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., to Goldfarb, Adolph E.; and Benkoe, Erwin. Game apparatus with positional strikers. 4,046,380, Cl. 273-119.00R.

Goldstein, Melvin, to Crane Co. Reverse osmosis treatment of battery waste. 4,046,686, Cl. 210-23.00H.

Goldthorp, David Clayton: *See—*
Embree, Milton Luther; Goldthorp, David Clayton; and O'Neill, John Francis, 4,046,968, Cl. 179-18.0FA.

Gomez, Nicolas Gueco, to Xerox Corporation. Laminar deep wave generator. 4,046,105, Cl. 118-429.000.

Gonyea, David C.: *See—*
Murphy, Bartholomew D.; and Gonyea, David C., 4,046,002, Cl. 73-116.000.

Goodner, Willis Ray; Smith, James Nelson; and Horvath, John, to Motorola, Inc. Stabilization of 1,1,1-trichloroethane. 4,046,820, Cl. 260-652.50R.

Goodwin, John E. Adjustable height stool. 4,046,348, Cl. 248-423.000.

Goodyear Tire & Rubber Company, The: *See—*
Bauer, John R., 4,046,428, Cl. 305-11.000.
Feeney, George W., 4,046,838, Cl. 260-876.00B.
Nowak, Edward N.; and Frech, Kenneth J., 4,046,832, Cl. 260-683.00D.

Gordon, Ronnie D.; and Starks, Charles M., to Continental Oil Company. Process for producing 1,2-dichloroethane. 4,046,823, Cl. 260-662.00R.

Gorin, Everett; Jasulaitis, William A.; Wasson, George E.; and Theodore, Frank William, to Consolidation Coal Company. Apparatus for agglomerating finely divided agglomerative materials in a rotating drum. 4,046,496, Cl. 425-222.000.

Gorog nee Privitzer, Katalin: *See—*
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Goroski, Robert D., to Measurement Systems, Incorporated. Three axis joystick control. 4,046,005, Cl. 73-133.00R.

Gorton, Howard Byron; and Lyons, Richard B., to Ajax Hardware Corporation. Compact portable lock for sliding windows and doors. 4,045,982, Cl. 70-90.000.

Gosling, Alexander Bennett; Ridler, Keith Douglas; Easthope, Frederick James; and Stanwell-Smith, Colin Howard, to Strathearn Audio Limited. Control device. 4,046,386, Cl. 274-23.00A.

Goto, Toru: *See—*
Hashimoto, Shinichiro; Goto, Toru; and Kajino, Yukio, 4,046,987, Cl. 219-135.000.

Gould Inc.: *See—*
Lee, Timothy Charles Philip; and Millns, William, 4,046,834, Cl. 260-752.000.

Graco Inc.: *See—*
Hoekstra, Joop Frans; Lumby, Donovan Harold; and Vork, William Duncan, 4,046,287, Cl. 222-16.000.

Granitsas, George A.: *See—*
Metcalfe, Richard T.; Granitsas, George A.; and Elliott, Edgar H., 4,046,596, Cl. 148-2.000.

Graphic Enterprises: *See—*
Frank, Thomas E.; Gum, Roy E.; Shoupe, J. T.; and Warner, Dennis L., 4,046,469, Cl. 355-13.000.

Gratzfeld, Everhard: *See—*
Reinhardt, Helmut; Gratzfeld, Everhard; and Clausen, Eva, 4,046,861, Cl. 423-367.000.

Green, Aaron F. Alternating controller comprising pair of mutually exclusively-operated timers. 4,047,058, Cl. 307-293.000.

Green, Cyril Robert, to Medio, Mario D.; and Medio, Grace E. Combination drill and plug and method and apparatus for using same for extracting a fluid sample from an electrical cable. 4,046,013, Cl. 73-422.00R.

Greenwald, Richard B., to Polaroid Corporation. Disulfonyl silver halide solvents substituted with piperazine at one sulfonyl group. 4,046,568, Cl. 96-29.00R.

Greer Hydraulics, Inc.: *See—*
Zahid, Abduz, 4,045,861, Cl. 29-454.000.

Grega nee Toth, Erzsebet: *See—*
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Grew, Leonard A. Device for digging, balling and relocating a tree and other material. 4,045,891, Cl. 37-2.00R.

Gribovszky, Pal: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Griesbach, Melbourne L., to EMF, Inc. Thickness responsive variable position die set. 4,046,039, Cl. 83-13.000.

Griffiths, Evan, to Amtel, Inc. Dancer pulley mechanism. 4,045,992, Cl. 72-279.000.

Grigat, Ernst: *See*—
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,046,796, Cl. 260-453.00P.

Grigoriev, Vitaly Markovich: *See*—
Kreimer, Vladimir Isakovich; Tishkov, Anatoly Yakovlevich; Grigoriev, Vitaly Markovich; Gendlina, Ljudmila Ivanovna; and Zimonin, Leonid Vasilievich, 4,046,249, Cl. 198-758.000.

Grillo, Joseph R. Prefabricated panel structure. 4,045,933, Cl. 52-475.000.

Grimes, Charles, to National Service Industries, Inc. Method and apparatus for mixing and dispensing material. 4,046,358, Cl. 259-147.000.

Grimm, Bruce F., Jr. Dispenser pump. 4,046,495, Cl. 417-268.000.

Grisebach, Hans Theodor, to Gewerkschaft Eisenhutte Westfalia. Control systems and arrangements for use in mineral mining installations. 4,046,058, Cl. 91-32.000.

Grob, Louis: *See*—
Muller, Hans; and Grob, Louis, 4,046,789, Cl. 260-412.800.

Grober, Melvin G.: *See*—
Cox, Robert N.; and Grober, Melvin G., 4,046,440, Cl. 312-215.000.

Groeneweg, Abraham, to N.V. Optische Industrie "De Oude Delft". Film transport. 4,047,209, Cl. 354-212.000.

Grosskopf, Rudolf, to Carl Zeiss-Stiftung. Method and means for measuring substance volumes in light-transmitting samples. 4,047,205, Cl. 358-107.000.

Groves, David John; and Mason, Albert, to Imperial Chemical Industries Limited. Casting of polymeric film. 4,046,842, Cl. 264-22.000.

Gruesbeck, Clay; Salathiel, William M.; Muecke, Thomas W.; and Cooke, Claude E., Jr., to Exxon Production Research Company. Method and apparatus for gravel packing wells. 4,046,198, Cl. 166-278.000.

Gruesbeck, Clay, Jr.; Penberthy, Walter L., Jr.; and Muecke, Thomas W., to Exxon Production Research Company. Well completion and workover method. 4,046,197, Cl. 166-305.00R.

Gruffaz, Max; and Locatelli, Jean-Louis, to Rhone-Poulenc Industries. Polymers with imide groups, and comprising a polyester free from aliphatic unsaturation. 4,046,835, Cl. 260-857.0PA.

GTE Sylvania Incorporated: *See*—
Cosco, Robert J.; Lima, Joseph V.; and Soucy, Frank, 4,047,064, Cl. 313-201.000.
Kuo, Samuel Chung-Shu; and Rosser, William D., 4,047,180, Cl. 343-784.000.
Miller, G. Kirby; and Lawler, John F., 4,047,166, Cl. 340-261.000.
Warner, Leadom A.; and Cleveland, Joseph J., 4,046,612, Cl. 156-205.000.

Guder, Gottfried: *See*—
Glowinski, Wolf; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 4,046,562, Cl. 96-1.50R.

Guglielmo, Richard J., Sr. Primer composition, process for using same and product obtained thereby. 4,046,587, Cl. 106-271.000.

Guillaume, Jacques: *See*—
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, 4,046,901, Cl. 424-267.000.

Guleserian, John E.: *See*—
Bernatt, Joseph; and Guleserian, John E., 4,047,142, Cl. 337-186.000.

Gulistan, Bulent, to Deutsch Fastener Corporation. Flarable threaded fastener. 4,046,054, Cl. 85-74.000.

Gum, Roy E.: *See*—
Frank, Thomas E.; Gum, Roy E.; Shoupe, J. T.; and Warner, Dennis L., 4,046,469, Cl. 355-13.000.

Gunzel, Peter: *See*—
Rosskamp, Gunter; Kolberg, Reiner; Gunzel, Peter; and Porep, Hans-Jurgen, 4,046,146, Cl. 128-266.000.

Gusev, Alexandr Mikhailovich: *See*—
Kholmogorov, Mikhail Vladimirovich; Katkov, Jury Vasilievich; Vorbiev, Grigory Vasilievich; Gusev, Alexandr Mikhailovich; and Nazaretian, Eduard Gurgenovich, 4,045,991, Cl. 72-251.000.

Gustafson, Hans Hjalmar. Fibrous building elements. 4,046,934, Cl. 428-155.000.

Gustafsson, Nils-Ake, to Sprinter Pack AB. Container. 4,046,310, Cl. 229-30.000.

Gutridge, Jack E.; Hallam, Keith J.; and Marsh, Ronald W., to Pullman Incorporated. Headrest ladder. 4,046,081, Cl. 105-326.000.

Gysling, Henry J.; and Lelental, Mark, to Eastman Kodak Company. Physical development of Pd(II) photosensitive complexes with a leucophthalocyanine dye and a reducing agent therefor. 4,046,569, Cl. 96-48.0PD.

Gyugyi, Laszlo; Stacey, Eric J.; and Brennen, Michael B., to Westinghouse Electric Corporation. Apparatus and method for transient free energization and deenergization of static VAR generators. 4,047,097, Cl. 323-119.000.

Habib, Edward T., Jr.: *See*—
Owen, Hartley; Venuto, Paul B.; and Habib, Edward T., Jr., 4,046,827, Cl. 260-672.00T.

Hackett, Robert J. Molten steel samplers. 4,046,016, Cl. 73-425.40R.

Hadersbeck, Hans: *See*—
Andrascek, Ernst; and Hadersbeck, Hans, 4,046,620, Cl. 156-666.000.

Hagemann, Julius, to United States of America, Navy. Piston type underwater sound generator. 4,047,148, Cl. 340-12.00R.

Hagenmaier, Hanspaul: *See*—
Dahn, Ursula; Hagenmaier, Hanspaul; Hohne, Helmut; Konig, Wilfried; Scheinpflug, Hans; and Zahner, Hans, 4,046,881, Cl. 424-181.000.

Hager, Stephen F.: *See*—
Brown, Alfred; Hager, Stephen F.; Chichakli, Moutaz; and Wu, Ching H., 4,046,196, Cl. 166-273.000.

Hagiya, Hiroshi: *See*—
Yagishita, Tohmi; and Hagiya, Hiroshi, 4,047,228, Cl. 358-261.000.

Hahnke, Manfred: *See*—
Hohmann, Kurt; Mohr, Reinhard; and Hahnke, Manfred, 4,046,752, Cl. 260-158.000.

Haines, James M.: *See*—
Meiner, Roger D.; Haines, James M.; and Alsberg, Henry, 4,046,726, Cl. 260-27.00R.

Hallam, Keith J.: *See*—
Gutridge, Jack E.; Hallam, Keith J.; and Marsh, Ronald W., 4,046,081, Cl. 105-326.000.

Halley, Angus Murray, to James Halley & Sons Limited. Rotary printing presses. 4,046,070, Cl. 101-216.000.

Hallgren, Bo Erik; and Stallberg, Gunnel Anna Maria, to Astra Nutrition AB. Therapeutically active substituted saturated and mono-and polyunsaturated alkyl-glycerylethers. 4,046,914, Cl. 424-312.000.

Hamba-Maschinenfabrik Hans A. Muller, Firma: *See*—
Moller, Erwin; Bausch, Franz Hubert; and Frolich, Martin, 4,045,945, Cl. 53-167.000.

Hammarstrand, Sten Ove, to Sveska Hymas Aktiebolag. Linkage and motion system, especially for accomplishing a swinging movement in equipment such as buckets for power shovels and the like. 4,046,026, Cl. 74-519.000.

Hammond Corporation: *See*—
Bione, Angelo A., 4,046,048, Cl. 84-1.030.

Hamparian, Nshan; and Bandrowski, Michael, Jr., to General Motors Corporation. Insulated, high efficiency, low heat rejection, engine cylinder head. 4,046,114, Cl. 123-41.760.

Hampton, Thomas W., to United States of America, Navy. Impulsive rocket motor safety-arming device. 4,046,076, Cl. 102-70.20A.

Hanfling, Jerome D.: *See*—
Appelbaum, Alfred J.; Collins, Michael J.; and Hanfling, Jerome D., 4,047,179, Cl. 343-768.000.

Hanni, Stephen Leroy: *See*—
Johnson, Dudley Bruce; and Hanni, Stephen Leroy, 4,046,981, Cl. 200-159.00B.

Hannibal, Alan J., to Lord Corporation. Vibration attenuating support for rotating member. 4,045,948, Cl. 57-129.000.

Hansen, Franklin A., to Continental Disc Corporation. Direct mounting reverse buckling disc. 4,046,280, Cl. 220-89.00A.

Hansen, Harold M., to Barrier Pressure Container, Inc. Method of filling barrier pressure container. 4,045,938, Cl. 53-22.00R.

Hansen, Kai H., to General Motors Corporation. Steerable front wheel drive transmitting mechanism. 4,046,212, Cl. 180-44.00R.

Hansson, Bengt; and Svensson, Sigfrid, to Armerad Betong Vagforbattringar Aktiebolag. Underground installation for storing petrol products. 4,045,963, Cl. 61-.500.

Harbulak, Edward P., to M&T Chemicals Inc. Additive for improved electroplating process. 4,046,647, Cl. 204-43.00T.

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Harper, Samuel: *See*—
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Perkins, Frank A., 4,047,008, Cl. 235-152.000.

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Clark, John A., Jr., 4,046,189, Cl. 165-39.000.
Glover, Nolan S., 4,046,693, Cl. 210-195.00S.

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Flam, Fred; and Hart, Dennis L., 4,045,835, Cl. 9-313.000.
Hart, John A. H., to Canada, Her Majesty the Queen in Right of. Gas resistant foam materials. 4,046,939, Cl. 428-311.000.
Hartel, Kurt: *See—*
Frensch, Heinz; Albrecht, Konrad; and Hartel, Kurt, 4,046,906, Cl. 424-273.00R.
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Kato, Yasuo; Kato, Katsuhiko; Sugino, Masahiro; Ikegami, Jun; and Harukawa, Junichi, 4,046,724, Cl. 260-9.000.
Harvey, Leslie E.; and Spiva, Stephan D. Bowling practice device. 4,046,376, Cl. 273-54.00D.
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Hashimoto, Shinichiro; Goto, Toru; and Kajino, Yukio, to Mitsubishi Denki Kabushiki Kaisha. DC arc welding apparatus using high-frequency pulse current. 4,046,987, Cl. 219-135.000.
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Ishino, Ken; Hashimoto, Yasuo; and Abe, Hiroaki, 4,046,983, Cl. 219-10.55D.
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Kataoka, Shoei; Komaniya, Yasuo; Hashizume, Nobuo; Tomizawa, Kazutaka; and Kawashima, Mitsuo, 4,047,199, Cl. 357-3.000.
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Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.
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Hauni-Werke Korber & Co. KG: *See—*
Rudszinat, Willy, 4,046,027, Cl. 74-567.000.
Wahle, Gunter, 4,046,064, Cl. 93-1.00C.
Havasi, Miklos: *See—*
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.
Hawkins, Richard T., to Phillips Petroleum Company. Phenylene sulfide oligomer production. 4,046,749, Cl. 260-79.000.
Hayashi, Osamu; Inagaki, Takahumi; and Yanagita, Yoshio, to Standard Technology, Inc. Apparatus for diluting gas. 4,046,158, Cl. 137-88.000.
Hayes, John C.: *See—*
Mitsche, Roy T.; Kuntz, Hillard L.; and Hayes, John C., 4,046,713, Cl. 252-455.00Z.
Pollitzer, Ernest L.; and Hayes, John C., 4,046,672, Cl. 208-139.000.
Pollitzer, Ernest L.; and Hayes, John C., 4,046,828, Cl. 260-673.500.
Hayes, Robert I., Jr.: *See—*
Furr, Robert L., 4,046,378, Cl. 273-85.00D.
Hayward, Donald J. Device for upending a ceramic mold. 4,046,272, Cl. 214-312.000.
Head, Glenn Dale, to Deere & Company. Means for controlling discharge door movement. 4,046,069, Cl. 100-255.000.
Healy, Dennis M.: *See—*
Juds, Richard C.; and Healy, Dennis M., 4,046,451, Cl. 339-177.00R.
Heard, Norris K.: *See—*
Korby, Leonard A.; and Heard, Norris K., 4,046,252, Cl. 206-95.000.
Heath (Gloucester) Ltd.: *See—*
Smith, Kenneth Browning; and Adams, Derek William, 4,047,036, Cl. 250-359.000.
Hebert, Jacques J.: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,046,953, Cl. 428-426.000.
Heckles, John S., to Armstrong Cork Company. Method of preparing β-amino derivatives of α,β-unsaturated esters. 4,046,803, Cl. 560-172.000.
Hedden Horst: *See—*
Sridhar, Srinivasan; and Hedden, Horst, 4,046,746, Cl. 260-78.00S.
Hedges, Rhey Warren, to Parker, Louis W. Television signal-seeking automatic tuning system. 4,047,226, Cl. 358-193.000.
Heemaf B.V.: *See—*
Wijnterp, Wierd, 4,047,095, Cl. 322-17.000.
Heil-Quaker Corporation: *See—*
Anderson, Richard M.; McGill, Robert S., III; and Ramsey, Robert W., 4,045,973, Cl. 62-158.000.
Heimann GmbH: *See—*
Dennhoven, Manfred; Kunze, Claus; and Kuehn, Rainhard, 4,047,035, Cl. 250-355.000.
Heimberger, Werner; and Schreyer, Gerd, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of cyanogen chloride using hydrogen peroxide with pressure. 4,046,862, Cl. 423-383.000.
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Hein, George Norton, Jr. Air levitation device for an air driven centrifuge. 4,046,317, Cl. 233-23.00R.
Heinemann, Heinz: *See—*
Chen, Nai Yuen; and Heinemann, Heinz, 4,046,522, Cl. 48-102.00A.
Heiser, Richard S.; and Aanstad, Ola J., to Westinghouse Electric Corporation. Combined cycle electric power plant with a steam turbine having a throttle pressure limiting control. 4,047,005, Cl. 235-151.210.
Helena, Bill F. Relaxation switch. 4,047,167, Cl. 340-280.000.
Helf, Harald: *See—*
Winkler, Franz; and Helf, Harald, 4,046,626, Cl. 176-38.000.
Heller, Alwin: *See—*
Sextro, Gunter; Burg, Karlheinz; Leugering, Hans Joachim; Schlaf, Helmut; and Heller, Alwin, 4,046,738, Cl. 260-67.0FP.
Heller, Lawrence Griffith, to International Business Machines Corporation. Method and apparatus for replicating a charge packet. 4,047,051, Cl. 307-221.00D.
Heller, Milton David: *See—*
Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,046,805, Cl. 260-506.000.
Helsley, Grover C.; Strupczewski, Joseph T.; and Gardner, Beth Ann, to American Hoechst Corporation. Benzoylpiperidylalkylindoles. 4,046,900, Cl. 424-267.000.
Henderson, Benjamin B., to Westinghouse Electric Corporation. Photoelectric disc reader with alternate reading locations. 4,047,024, Cl. 250-231.0SE.
Henderson, Dewey D., to Dayco Corporation. Belt drive system. 4,046,022, Cl. 74-220.000.
Henderson, Joseph E. Printing die rotary gluing table. 4,046,072, Cl. 101-415.100.
Henkel & Cie GmbH: *See—*
Kubersky, Hans Peter, 4,046,503, Cl. 8-10.200.
Henle, Richard G.; Merkert, Clifton S.; and Thomas, David C., to FMC Corporation. Adjusting mechanism for transmission band tensioner. 4,046,023, Cl. 74-242.800.
Hercules Incorporated: *See—*
Einerhand, Johan Jozef; Colbers, Gerardus Johannes Baptist; Huck, Wilhelmus Martha Andreas; and Geurts, Herman Jozef Johannes Maria, 4,046,588, Cl. 106-298.000.
Herman, Richard Michael: *See—*
Carman, Charles Jerry; Batiuk, Martin; and Herman, Richard Michael, 4,046,840, Cl. 260-897.00A.
Herring, Bernard D. Adjustable flashlight swingable bracket for a writing instrument. 4,047,017, Cl. 240-6.460.
Hershman, Gordon L.; and Datta, Arthur S., to International Harvester Company. Locking control device. 4,046,236, Cl. 192-8.00R.
Hertl, William; and Odstrchel, Gerald, to Corning Glass Works. Assay for free thyroid hormones. 4,046,870, Cl. 424-1.000.
Hertz, Walter; Stroh, Jan; and Mentel, Jurgen, to Siemens Aktiengesellschaft. Arc quenching arrangement for a gas-flow type circuit breaker. 4,046,979, Cl. 200-148.00A.
Hessler, Edward J., to Upjohn Company, The. Cis-β-[Trimethylammonium]-acrylonitrile tosylate. 4,046,800, Cl. 260-465.00E.
Hewett, Charley L., to Kem-O-Kleen, Inc. High pressure spray cleaning head. 4,046,321, Cl. 239-420.000.
Hewlett-Packard Company: *See—*
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; Baum, Allen J.; Cochran, David S.; and Tung, Chung C., 4,047,012, Cl. 235-156.000.
Lyman, Richard Ricker; and Waitman, Thomas Frank, 4,047,248, Cl. 364-900.000.
Heylen, Renaat Frans: *See—*
Fierens, Marcel Robert; and Heylen, Renaat Frans, 4,046,570, Cl. 96-61.00R.
Hibi, Masao: *See—*
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,046,455, Cl. 350-150.000.
Hibner, David H.: *See—*
Buono, Dennis F.; Carlson, Nils G.; Hibner, David H.; and Moringiello, Donald C., 4,046,430, Cl. 308-26.000.
Hicklin, Dennis Raymond: *See—*
Attwood, Brian William; and Hicklin, Dennis Raymond, 4,046,622, Cl. 162-132.000.
Hicks, John J.: *See—*
Burnett, Joseph C., Jr.; Hicks, John J.; and Hovey, Leonard L., 4,046,651, Cl. 204-73.00R.
Hietanen, Ari, deceased: *See—*
Hietanen, Esko; Hietanen, Ari, deceased; and Hietanen, Margo-Ritta, heiress, 4,046,215, Cl. 180-116.000.
Hietanen, Esko; Hietanen, Ari, deceased; and by Hietanen, Margo-Ritta, heiress. Vessel mobile on air cushion or the like. 4,046,215, Cl. 180-116.000.
Hietanen, Margo-Ritta, heiress: *See—*
Hietanen, Esko; Hietanen, Ari, deceased; and Hietanen, Margo-Ritta, heiress, 4,046,215, Cl. 180-116.000.
Higgins, James Francis, to Du Pont de Nemours, E. I., and Company. Calcium-silico-zirconate primer pigment. 4,046,589, Cl. 106-299.000.
Hijikata, Akiko: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.

Hill, Jerry M., to FMC Corporation. Wheel balancing apparatus. 4,046,017, Cl. 73-462.000.
Hill, William L. Handles for cardboard or corrugated paper boxes. 4,046,314, Cl. 229-52.0AW.
Hill, Winfield: *See*—
Huhn, Mary Susan; Horowitz, Paul; and Hill, Winfield, 4,046,992, Cl. 235-54.00F.
Hilti Aktiengesellschaft: *See*—
Rosler, Peter, 4,046,279, Cl. 220-8.000.
Himmler, Dennis W., to General Motors Corporation. Dual voltage charging system. 4,047,088, Cl. 320-6.000.
Hinata, Masanao; Mihara, Yuji; Sato, Akira; and Ikeda, Tadashi, to Fuji Photo Film Co., Ltd. Silver halide photographic light sensitive material. 4,046,572, Cl. 96-69.000.
Hind, John Richard: *See*—
Durston, John Graham; and Hind, John Richard, 4,046,629, Cl. 176-38.000.
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, to Mitsui Toatsu Chemicals, Inc. Process for preparing aminoanthraquinones. 4,046,785, Cl. 260-380.000.
Hirano, Goro: *See*—
Kawamura, Yuichi; Hirano, Goro; Nagai, Makoto; and Miura, Yasunobu, 4,046,582, Cl. 106-88.000.
Hirasawa, Kazuhiko; and Okamoto, Yasuo, to Sumitomo Aluminum Smelting Co., Ltd.; and Kyowa Carbon Company, Limited. Carbon block for cathodes of aluminum. 4,046,650, Cl. 204-67.000.
Hisagen, Yoshiaki; and Hoshi, Kazuo, to Sony Corporation. Leader tape. 4,047,232, Cl. 360-134.000.
Hitachi Chemical Company, Ltd.: *See*—
Izumi, Takichiro; Chiba, Shigeo; and Kobayashi, Kazumitsu, 4,046,136, Cl. 126-271.000.
Hitachi, Ltd.: *See*—
Fukuda, Teruo; and Otomo, Tetuo, 4,047,139, Cl. 336-150.000.
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,046,455, Cl. 350-150.000.
Ohmura, Yoshito; Okabe, Takahiro; and Morozumi, Hiroshi, 4,047,119, Cl. 330-30.00D.
Sakamoto, Yoshio; and Kominami, Yasuo, 4,047,118, Cl. 330-22.000.
HMW Industries, Inc.: *See*—
Nelson, John E., 4,045,871, Cl. 32-14.00E.
Hobler, Ross L.: *See*—
Bryant, Nelson H.; Hobler, Ross L.; Allen, Wilbur J.; and Poliseo, Joseph W., 4,047,000, Cl. 235-151.100.
Hochberg, Frederick, deceased (by Hochberg, Lee, administratrix); and Pennington, Keith Samuel, to International Business Machines Corporation. Non-impact printing system. 4,046,074, Cl. 101-426.000.
Hochberg, Frederick, deceased: *See*—
Mitchell, Joan LaVerne; Pennington, Keith Samuel; and Hochberg, Frederick, deceased, 4,046,073, Cl. 101-426.000.
Hochberg, Lee, administratrix: *See*—
Hochberg, Frederick, deceased; and Pennington, Keith Samuel, 4,046,074, Cl. 101-426.000.
Mitchell, Joan LaVerne; Pennington, Keith Samuel; and Hochberg, Frederick, deceased, 4,046,073, Cl. 101-426.000.
Hoechst Aktiengesellschaft: *See*—
Feess, Erich; and Maier, Hans-Peter, 4,046,506, Cl. 8-21.00R.
Frensch, Heinz; Albrecht, Konrad; and Hartel, Kurt, 4,046,906, Cl. 424-273.00R.
Hohmann, Kurt; Mohr, Reinhard; and Hahnke, Manfred, 4,046,752, Cl. 260-158.000.
Kuckertz, Herbert, 4,046,807, Cl. 260-549.000.
Meininger, Fritz; and Springer, Hartmut, 4,046,754, Cl. 260-162.000.
Moraw, Roland, 4,047,238, Cl. 361-229.000.
Muller, Werner Heinrich, 4,046,816, Cl. 260-613.00R.
Otten, Joachim; and Troster, Helmut, 4,046,501, Cl. 8-1.00E.
Pistorius, Rudolf; and Millauer, Hans, 4,046,652, Cl. 204-78.000.
Sextro, Gunter; Burg, Karlheinz; Leugering, Hans Joachim; Schlaf, Helmut; and Heller, Alwin, 4,046,738, Cl. 260-67.0FP.
Winkelmann, Erhardt; and Raether, Wolfgang, 4,046,896, Cl. 424-263.000.
Hoekstra, Joop Frans; Lumby, Donovan Harold; and Vork, William Duncan, to Graco Inc. Automatic metering and dispensing system. 4,046,287, Cl. 222-16.000.
Hoffmann-La Roche Inc.: *See*—
Brenner, Wolf, 4,046,813, Cl. 260-586.00P.
Hassall, Cedric Herbert; Johnson, William Henry; Krohn, Antonin; Smithen, Carey Ernest; and Thomas, William Anthony, 4,046,751, Cl. 260-112.50R.
Szente, Andre, 4,046,890, Cl. 424-244.000.
Hofmann, Charles J.; and Suess, Frederick F., to Fidelity Electric Company, Incorporated. Bearing assembly and anchor therefor. 4,046,432, Cl. 308-189.00R.
Hofmann, Judson A., to Zenith Radio Corporation. Frequency scanning automatic phase control system. 4,047,223, Cl. 358-158.000.
Hogberg, Knut Goran: *See*—
Malmberg, Thor Anders Helge; Hogberg, Knut Goran; and Sjoquist, Stig Roland, 4,047,033, Cl. 250-341.000.
Hohmann, Kurt; Mohr, Reinhard; and Hahnke, Manfred, to Hoechst Aktiengesellschaft. Process for preparing an azo compound from a 2-aminothiazole diazo component. 4,046,752, Cl. 260-158.000.
Hohne, Helmut: *See*—
Dahn, Ursula; Hagenmaier, Hanspaul; Hohne, Helmut; Konig, Wilfried; Scheinpflug, Hans; and Zahner, Hans, 4,046,881, Cl. 424-181.000.
Holden, Ronald L., to Therm-O-Disc, Inc. Calibration and mounting structure for motor controllers or the like. 4,047,141, Cl. 337-89.000.
Holland, Andrew Macdonald: *See*—
Lomas, James Arthur, III; Lee, Ronald La Verne; and Holland, Andrew Macdonald, 4,046,091, Cl. 114-39.000.
Hollandsche Beton Groep N. V.: *See*—
Jansz, Joost W., 4,045,969, Cl. 61-535.000.
Holle, Werner: *See*—
Bletz, Walter; and Holle, Werner, 4,047,189, Cl. 354-23.00D.
Holle, Werner H., to Ernst Leitz GmbH. Auto focus with spatial filtering and pairwise interrogation of photoelectric diodes. 4,047,022, Cl. 250-201.000.
Hollins, Brian E.: *See*—
Nelson, Carl T.; and Hollins, Brian E., 4,046,605, Cl. 148-175.000.
Holloway, David G.: *See*—
Massey, Roger G.; and Holloway, David G., 4,046,350, Cl. 251-58.000.
Holroyd, Floyd M.: *See*—
Cwycyshyn, Walter; and Holroyd, Floyd M., 4,046,263, Cl. 214-1.0BC.
Holt, Brian; and Randell, Donald Richard, to Ciba-Geigy Corporation. Piperidine derivatives. 4,046,737, Cl. 260-45.80N.
Holz, George E., to Burroughs Corporation. Display panel having improved arrangement of reset cells for facilitating scanning of the panel. 4,047,169, Cl. 340-324.00M.
Holz, Norbert J.: *See*—
Holz, Orville H., Sr.; and Holz, Norbert J., 4,046,484, Cl. 404-112.000.
Holz, Orville H., Jr.: *See*—
Holz, Orville H., Sr.; and Holz, Norbert J., 4,046,484, Cl. 404-112.000.
Holz, Orville H., Sr.; and Holz, Norbert J., to Holz, Orville H., Jr., a part interest. Spaced-rotor ride-type surface working machine with single-stick control of all movements. 4,046,484, Cl. 404-112.000.
Holzenberger, Kurt, to Klein, Schanzlin & Becker Aktiengesellschaft. Stuffing box. 4,046,389, Cl. 277-113.000.
Honda, Hidemasa: *See*—
Kobayashi, Kazuo; Ogawa, Ichitaro; Honda, Hidemasa; and Matsushita, Yasuhiro, 4,046,863, Cl. 423-448.000.
Honeywell Farms Inc.: *See*—
Virog, John J., Jr.; Von Hagel, Leo; and Platte, Richard L., 4,046,275, Cl. 215-1.00C.
Honeywell Inc.: *See*—
Bonne, Ulrich, 4,046,456, Cl. 350-160.00R.
Burns, Dallas D., 4,045,959, Cl. 60-632.000.
Kompelien, Arlon D., 4,047,038, Cl. 250-372.000.
Nakagawa, Kazuyoshi, 4,047,056, Cl. 307-271.000.
Nelson, Lorne W.; and Sutton, David J., 4,046,531, Cl. 62-202.000.
Nelson, Lorne W., 4,046,532, Cl. 62-215.000.
Honeywell Information Systems Inc.: *See*—
Lee, Fred S., 4,047,236, Cl. 360-113.000.
Nowell, John Rawson, 4,045,887, Cl. 361-98.000.
Stanley, Philip E.; Woods, William E.; and Izbicki, Kenneth J., 4,047,247, Cl. 364-200.000.
Hoogovens IJmuiden B.V.: *See*—
Schmidt, Kees J., 4,046,542, Cl. 65-19.000.
Hook, Rollin E., to Armco Steel Corporation. Method of nitride-strengthening low carbon steel articles. 4,046,601, Cl. 148-15.000.
Hoople, Gary R., to United States of America, Navy. Omnidirectional antenna. 4,047,181, Cl. 343-789.000.
Horn, Bernard. Medical temperature measuring device. 4,046,139, Cl. 128-2.00H.
Hornung, Arthur Charles. Collar for redirecting propeller energy. 4,046,097, Cl. 115-42.000.
Horowitz, Paul: *See*—
Huhn, Mary Susan; Horowitz, Paul; and Hill, Winfield, 4,046,992, Cl. 235-54.00F.
Horsch, Joachim, to International Harvester Company. Transmission clutches with sequence valve and piston-controlled pressure modulator. 4,046,160, Cl. 137-115.000.
Horton, Edward L.: *See*—
Gilbert, Neal J.; and Horton, Edward L., 4,045,915, Cl. 51-427.000.
Horvath, John: *See*—
Goodner, Willis Ray; Smith, James Nelson; and Horvath, John, 4,046,820, Cl. 260-652.50R.
Horvath, Louis T., to Detroit Marine Engineering Corporation. Gland nut retaining means. 4,046,481, Cl. 403-320.000.
Horwitt, Laurence G., to Sun Chemical Corporation. Method of making an electrical igniting unit. 4,045,865, Cl. 29-611.000.
Hosford, Charles D.; and Simpson, Barry. Folding stool and table. 4,046,084, Cl. 108-112.000.
Hoshi, Kazuo: *See*—
Hisagen, Yoshiaki; and Hoshi, Kazuo, 4,047,232, Cl. 360-134.000.
Houdaille Industries, Inc.: *See*—
Troyer, William J., 4,046,230, Cl. 188-1.00B.
Houston, John M., to General Electric Company. Two-dimensional x-ray detector array. 4,047,039, Cl. 250-385.000.
Houston, John M., to General Electric Company. Gridded ionization chamber. 4,047,040, Cl. 250-385.000.
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Hovey, Leonard L.: *See—*
Burnett, Joseph C., Jr.; Hicks, John J.; and Hovey, Leonard L., 4,046,651, Cl. 204-73.00R.
Hovey, Richard J.: *See—*
Uhlmann, Donald R.; Snitzer, Elias; Hovey, Richard J.; Chu, Nori Y. C.; and Fournier, Joseph T., Jr., 4,046,586, Cl. 106-194.000.
Howell, William G.: *See—*
Wittman, Robert H.; and Howell, William G., 4,046,301, Cl. 228-108.000.
Howeth, Bobby W.: *See—*
Paxton, Grady W., Jr.; Howeth, Bobby W.; Mehal, Edward W.; Cashion, William F.; and Cashion, Charles M., 4,047,045, Cl. 250-551.000.
Howlett, Richard Martin: *See—*
Elliott, John Scotchford; Davis, Bryan Terence; and Howlett, Richard Martin, 4,046,802, Cl. 560-61.00G.
Hubbard, S. Eugene: *See—*
Papp, Joseph; Meisterheim, Richard A.; and Hubbard, S. Eugene, 4,046,167, Cl. 138-31.000.
Hubele, Adolf, to Ciba-Geigy Corporation. N-(substituted phenyl)-n-furanoyl-alanine methyl esters and their use in fungicidal composition and methods. 4,046,911, Cl. 424-285.000.
Huck, Wilhelmus Martha Andreas: *See—*
Einerhand, Johan Jozef; Colbers, Gerardus Johannes Baptist; Huck, Wilhelmus Martha Andreas; and Geurts, Herman Jozef Johannes Maria, 4,046,588, Cl. 106-298.000.
Hudson, Frederick W., to Xerox Corporation. Toner reclaiming system. 4,046,682, Cl. 209-250.000.
Hudson, Thomas H.: *See—*
Wells, William M., 4,045,958, Cl. 60-325.000.
Hughes Aircraft Company: *See—*
Sekhon, Kalwant S.; Nelson, Lloyd A.; and Fritz, John E., Jr., 4,047,198, Cl. 357-82.000.
Tuchyner, Harold J.; and Benson, Robert C., 4,047,117, Cl. 330-4.300.
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Hardy, Michel; and Humbert, Daniel, 4,046,902, Cl. 424-270.000.
Hunt, Brian Keith, to Plessey Handel und Investments AG. Record players. 4,046,385, Cl. 274-10.00R.
Hunt, Robert Carroll: *See—*
Berger, Lawrence A.; and Hunt, Robert Carroll, 4,047,099, Cl. 324-30.00R.
Hunter, Don L.: *See—*
Woods, William G.; and Hunter, Don L., 4,046,758, Cl. 260-239.00E.
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Hutchines, Jimmy L.; and Meyer, John E., to National Semiconductor Corporation. Capacitive voltage multiplier. 4,047,091, Cl. 321-15.000.
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Hynd, William Christie, to Pilkington Brothers Limited. Method and apparatus for refining glass in a melting tank. 4,046,546, Cl. 65-135.000.
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Rose, Robert C., Sr.; and McClelland, Harold H., 4,046,165, Cl. 137-624.270.
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Diaz, D. Angel Chocarro, 4,045,927, Cl. 52-127.000.
Ichiyanagi, Toshikazu: *See—*
Shimazaki, Mamoru; Toyama, Masamichi; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,464, Cl. 352-141.000.
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Ide, Allan R. Retractable cargo transfer apparatus. 4,046,266, Cl. 214-14.000.
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Ensmann, Burt; Nielsen, Edwin A.; Snyder, Edward, III; and Ventura, Frank D., 4,045,908, Cl. 46-204.000.
IDN Inventions and Development of Novelties AG: *See—*
Ackeret, Peter, 4,046,255, Cl. 206-387.000.
Igoe, Robert S., to Merck & Co., Inc. Acidified milk product and method of producing the same. 4,046,925, Cl. 426-573.000.
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Mizuno, Masayoshi; Kawamoto, Tadashi; and Iida, Kiichi, 4,046,071, Cl. 101-395.000.
Iijima, Katsuhiko; and Yoshida, Katsuhiko, to Mitsubishi Jukogyo Kabushiki Kaisha. Slide mechanism having means for fixing movable frames. 4,046,346, Cl. 248-298.000.
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Shipchandler, Mohammed T., 4,046,817, Cl. 260-621.00R.
Imperial Chemical Industries Limited: *See—*
Cassidy, John Edward, 4,046,581, Cl. 106-85.000.
Clissett, Dennis Edward, 4,045,981, Cl. 66-147.000.
Cobb, Malcolm Carnie; and Elliott, Pamela, 4,046,505, Cl. 8-18.00R.
Davies, George Edward; and Foulkes, David Mackie, 4,046,552, Cl. 71-92.000.
Foster, Robert; Preston, Roger Edwin; and Robinson, Graham Ernest, 4,046,841, Cl. 260-923.000.
Groves, David John; and Mason, Albert, 4,046,842, Cl. 264-22.000.
Lewis, Cyril John; Carter, Neil; and Ray, Neil Hunter, 4,046,540, Cl. 65-18.000.
Shaw, Andrew, 4,046,898, Cl. 424-263.000.
Inada, Kazuyoshi: *See—*
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,046,670, Cl. 208-48.0AA.
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Hayashi, Osamu; Inagaki, Takahumi; and Yanagita, Yoshio, 4,046,158, Cl. 137-88.000.
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Lovisek, Louis J., 4,046,051, Cl. 85-47.000.
Infante, Samuel J. Dispersant for the application of dental ceramic. 4,046,732, Cl. 260-31.20R.
Ing. C. Olivetti & C., S.p.A.: *See—*
Romano, Antonio, 4,047,055, Cl. 307-262.000.
Inglis, Leslie R., to Vortec Corporation. Air flow amplifier. 4,046,492, Cl. 417-197.000.
Innes, Robert Arthur; Enright, Gregory Preston Michael; and Derrick, Garnet Lloyd, to Alcan Research and Development Limited. Method and apparatus for applying coating compositions to strip material. 4,046,931, Cl. 427-428.000.
Inoue, Nobuyoshi; and Shimizu, Munetaka, to Copal Company Limited. Mechanical exposure control means for electric shutters. 4,047,211, Cl. 354-258.000.
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Inouye, Kozo; Nakamura, Kotaro; Yokota, Yukio; Nakazyo, Kiyoshi; and Okumura, Akio, to Fuji Photo Film Co., Ltd. Color photographic materials. 4,046,573, Cl. 96-74.000.
Insetta, Victor. Multiple electrode capacitor assembly. 4,047,240, Cl. 361-275.000.
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Manghisi, Elso; and Salimbeni, Aldo, 4,046,762, Cl. 544-148.000.
Interkal, Inc.: *See—*
Molloy, Richard P., 4,045,921, Cl. 52-9.000.
Interlake, Inc.: *See—*
Redelman, Paul E.; and Busam, Donald H., 4,046,267, Cl. 214-16.40B.
International Business Machines Corporation: *See—*
Bassous, Ernest; and Kuhn, Lawrence, 4,047,184, Cl. 346-75.000.
Branham, Charles Escom; Steury, Thomas Dean; and Woodward, John Maury, 4,046,471, Cl. 355-14.000.
Chaudhari, Praveen; Cuomo, Jerome John; and Matthews, John Wauchope, 4,046,618, Cl. 156-603.000.
Comerford, Liam David; and Zory, Peter Stephen, Jr., 4,047,124, Cl. 331-94.50H.
Davis, Michael Ian, 4,047,161, Cl. 364-200.000.
Dreyfus, Russell Warren, 4,047,125, Cl. 331-94.5PE.
Finkemeyer, Karl-Friedrich; Roehr, Kuno M.; and Sonntag, Guenther, 4,047,244, Cl. 364-200.000.
Gates, Gerald Alan, 4,046,985, Cl. 219-121.00L.
Heller, Lawrence Griffith, 4,047,051, Cl. 307-221.00D.
Hochberg, Frederick, deceased; and Pennington, Keith Samuel, 4,046,074, Cl. 101-426.000.
Kendall, Arthur Harry; and Rohr, Robert Lewis, 4,047,186, Cl. 346-140.00R.
Milewski, Andrzej, 4,047,013, Cl. 235-156.000.
Mitchell, Joan LaVerne; Pennington, Keith Samuel; and Hochberg, Frederick, deceased, 4,046,073, Cl. 101-426.000.
Stuckert, Paul Edward, 4,047,135, Cl. 335-58.000.
Taub, Howard Hyman, 4,047,183, Cl. 346-1.000.
Thirion, Philippe Emmanuel, 4,047,153, Cl. 340-146.3AQ.
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Krajewski, Ignacy, 4,047,132, Cl. 333-84.00M.
International Harvester Company: *See—*
Hershman, Gordon L.; and Datta, Arthur S., 4,046,236, Cl. 192-8.00R.
Horsch, Joachim, 4,046,160, Cl. 137-115.000.
McKee, Kenneth E.; and McAllister, Alex J., 4,046,021, Cl. 74-110.000.
Ward, Gerald G., 4,046,203, Cl. 172-456.000.
International Nickel Company, Inc., The: *See—*
Subramanian, Kohur Nagaraja; and Glaum, Gerald Vernon, 4,046,851, Cl. 423-41.000.

International Standard Electric Corporation: *See*—
Adelaar, Hans Helmut, 4,046,963, Cl. 179-15.00A.
Kirkby, Paul Anthony, 4,047,123, Cl. 331-94.50H.
Overbury, Francis G., 4,047,177, Cl. 343-113.0DE.
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Anhalt, John W., 4,046,445, Cl. 339-95.00D.
Kontomerkos, Andrew, 4,046,965, Cl. 179-18.0DA.
Stevens, Charles H., 4,046,045, Cl. 83-620.000.
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Bodor, Nicolae S., 4,046,899, Cl. 424-266.000.
Ireland, Henry R.; and Stein, Thomas R., to Mobil Oil Corporation. Method for improving the Fischer-Tropsch synthesis product distribution. 4,046,829, Cl. 260-676.00R.
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Irie, Kenji: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.
Irons, Eric, to Ballast-Nedam Groep, N.V. Method for collecting light-weight substance floating on a liquid surface. 4,046,691, Cl. 210-83.000.
Isett, Lawrence Clair, to Eastman Kodak Company. Chalcogenated tetracene organic metals. 4,046,950, Cl. 428-411.000.
Ishihara Sangyo Kaisha, Ltd.: *See*—
Takahashi, Ryohei; Fujikawa, Kanichi; Yokomichi, Isao; Tsujii, Yasuhiro; and Sakashita, Nobuyuki, 4,046,553, Cl. 71-94.000.
Ishii, Takashi; Nishida, Katsutoshi; Komatsu, Michiyasu; and Tsuge, Akihiko, to Tokyo Shibaura Electric Co., Ltd. Silicon nitride-based sintered material and method for manufacturing the same. 4,046,580, Cl. 106-55.000.
Ishimaru, Toshiyasu. Penicillin esters. 4,046,759, Cl. 260-239.100.
Ishino, Ken; Hashimoto, Yasuo; and Abe, Hiroaki, to TDK Electronics Co., Ltd. Microwave heating oven having seal means for preventing the leakage of microwave energy. 4,046,983, Cl. 219-10.55D.
Ishiyama, Hideki, to Murata Manufacturing Co., Ltd. Elastic surface wave filter. 4,047,129, Cl. 333-72.000.
Island Lumber Specialties Ltd.: *See*—
Marshall, Henry James; Windblad, Stuart Walter; and Wagner, William, 4,046,180, Cl. 144-117.00B.
Itai, Reiichi; and Murakami, Katsuyuki, to Japan Carlit Company, Ltd., The. Process for electrolytically purifying a photographic developer waste solution. 4,046,655, Cl. 204-149.000.
Itasca Magnetics, Inc.: *See*—
Fritz, Alan J., 4,046,680, Cl. 209-214.000.
Itek Corporation: *See*—
Ebner, Peter R. S., 4,046,372, Cl. 271-273.000.
Root, Ernest F.; Kunica, Serge; and Simmons, Harry M., 4,046,135, Cl. 126-271.000.
Ito, Fumio: *See*—
Mashimo, Yukio; Sakurada, Nobuaki; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,047,187, Cl. 354-23.00D.
Ito, Shojiro: *See*—
Itoh, Iko; Inoue, Yasuhiko; Ito, Shojiro; and Kawamura, Kazumitsu, 4,046,727, Cl. 260-28.50R.
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Itoo, Hayami; Takahashi, Noriaki; and Kouda, Hiromasa, to Kawasaki Jukogyo Kabushiki Kaisha. Method for removing sulfur oxide from stack gas. 4,046,856, Cl. 423-166.000.
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Shimazaki, Mamoru; Toyama, Masamichi; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,464, Cl. 352-141.000.
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Akutsu, Hidezo; Iwama, Katsuaki; Saito, Naoki; Takagawa, Masanori; Kobayashi, Yoshichika; and Atsumi, Tamisuke, 4,047,069, Cl. 313-487.000.
Iwasaki, Yuji; and Kashima, Koichi, to Diesel Kiki Co., Ltd. Diesel Engine diagnosing device. 4,046,004, Cl. 73-119.00A.
Izawa, Akio: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.
Izbicki, Kenneth J.: *See*—
Stanley, Philip E.; Woods, William E.; and Izbicki, Kenneth J., 4,047,247, Cl. 364-200.000.
Izumi, Sumio: *See*—
Saitoh, Kozo; Tanaka, Hiroshi; Nagahama, Tatsuya; and Izumi, Sumio, 4,046,677, Cl. 209-166.000.
Izumi, Takichiro; Chiba, Shigeo; and Kobayashi, Kazumitsu, to Hitachi Chemical Company, Ltd. Solar energy collecting device. 4,046,136, Cl. 126-271.000.
Izumo, Masanori; and Nakakita, Sigeru, to Daikin Kogyo Co. Ltd. Multi-stage fluidized-bed activated carbon regeneration apparatus. 4,046,530, Cl. 55-181.000.
J. M. Voith GmbH: *See*—
Schmid, Heinrich, 4,046,623, Cl. 162-306.000.
J. N. Johnson Company, Inc.: *See*—
Lee, Walter F., 4,046,412, Cl. 292-200.000.
J. P. Burroughs & Son, Inc.: *See*—
Wood, Michael J., 4,046,066, Cl. 99-323.700.
Jacobus, David P.: *See*—
Dorn, Conrad P.; Jones, Howard; and Jacobus, David P., 4,046,897, Cl. 424-263.000.
Jakob, Gert; and Goetzke, Siegfried, to Robert Bosch G.m.b.H. Compact electronic control and power unit structure. 4,047,242, Cl. 361-389.000.
James, Arthur M.; and Conlee, Charles J. Apparatus for hoisting a structural member. 4,046,414, Cl. 294-81.00R.
James Halley & Sons Limited: *See*—
Halley, Angus Murray, 4,046,070, Cl. 101-216.000.
Janek, Klaus: *See*—
Skrivanek, Karl; and Janek, Klaus, 4,046,222, Cl. 184-6.110.
Janning, Eugene A., to Xetron Corporation. Transmitter coupled active filter. 4,047,110, Cl. 325-123.000.
Jansen, John R., to Eastman Kodak Company. Apparatus for laminating film strips to a transport web. 4,046,615, Cl. 156-544.000.
Jansen, Peter: *See*—
Brandt, Bernd; Jansen, Peter; and Liesenfeld, Heinz, 4,045,881, Cl. 34-138.000.
Jansz, Joost W., to Hollandsche Beton Groep N. V. Submergible pile driving method and apparatus for continuous operation. 4,045,969, Cl. 61-535.000.
Janzon, Bo Lennart, to Uddehoms Aktiebolag. Procedure for manufacture of steel band or strip. 4,046,598, Cl. 148-12.00R.
Japan Carlit Company, Ltd., The: *See*—
Itai, Reiichi; and Murakami, Katsuyuki, 4,046,655, Cl. 204-149.000.
Jarman, Alonzo B.: *See*—
Zeuner, Kenneth W.; and Jarman, Alonzo B., 4,046,399, Cl. 280-420.000.
Jasulaitis, William A.: *See*—
Gorin, Everett; Jasulaitis, William A.; Wasson, George E.; and Theodore, Frank William, 4,046,496, Cl. 425-222.000.
Jeninga, John, to Atlantic Products Corporation. Golf ball retriever. 4,046,413, Cl. 294-19.00A.
Jenkins, Raymond F., to Rohm and Haas Company. Thermosetting coatings based on ketoxime-blocked isocyanates and oxazolidines. 4,046,744, Cl. 260-77.5AQ.
Jenkins, Stephen R., to Digital Equipment Corporation. Secondary storage facility for data processing. 4,047,157, Cl. 364-900.000.
Jennings, Alan K., to Pertec Corporation. Peripheral processing system. 4,047,158, Cl. 364-900.000.
Jeno's, Inc.: *See*—
Moline, Roy V., 4,046,920, Cl. 426-19.000.
Johansson, Erik Karl Gustav, to Aktiebolaget Electrolux. Vacuum cleaner tool for cleaning deep pile carpets. 4,045,840, Cl. 15-397.000.
John Thomas Batts, Inc.: *See*—
Garrison, Judd F., 4,046,293, Cl. 223-88.000.
John Wyeth & Brother Limited: *See*—
Cavalla, John Frederick; and Archibald, John Leheup, 4,046,767, Cl. 260-293.770.
Curran, Adrian Charles Ward; and Shepherd, Robin Gerald, 4,046,895, Cl. 424-258.000.
Johns Hopkins University, The: *See*—
Miller, Robert E., 4,047,170, Cl. 343-5.0PC.
Johnson, Bruce K.; and Whiteside, George D., to Polaroid Corporation. Hybrid exposure control system employing dual maximum blade displacement. 4,047,190, Cl. 354-27.000.
Johnson, Bruce K.; Van Allen, David E.; and Whiteside, George D., to Polaroid Corporation. Photographic apparatus with sequencing system. 4,047,192, Cl. 354-83.000.
Johnson, Dudley Bruce; and Hanni, Stephen Leroy, to Texas Instruments Incorporated. Keyboard switch with printed wiring board structure and its method of manufacture. 4,046,981, Cl. 200-159.00B.
Johnson, Gordon Carlton; and Metzler, Richard Bruce, to Union Carbide Corporation. Treatment of paper and textile fabrics with emulsified epoxy-silicones. 4,046,930, Cl. 427-387.000.
Johnson, Herbert G., to Upjohn Company, The. Dosage schedule. 4,046,910, Cl. 424-278.000.
Johnson & Johnson: *See*—
Mesek, Frederick K.; and Repke, Virginia L., 4,045,833, Cl. 5-335.000.
Mouwen, Herman Charles, 4,046,696, Cl. 210-431.000.
Johnson, Leighton Clifford, to Miles Laboratories, Inc. Printed reagent test devices and method of making same. 4,046,513, Cl. 23-253.0TP.
Johnson, Roy O.: *See*—
Johnson, William A.; and Johnson, Roy O., 4,046,320, Cl. 237-8.00C.
Johnson, William A.; and Johnson, Roy O. Fireplace boiler heating system for hot water type furnaces. 4,046,320, Cl. 237-8.00C.
Johnson, William Henry: *See*—
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Johnston, Gordon Francis; Martin, Alexander; and Tomlinson, Alan Digby, to Lever Brothers Company. Detergent bars. 4,046,717, Cl. 252-546.000.
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Johnston, Kenneth Alan: *See—*
Stringer, Robert Kenneth; and Johnston, Kenneth Alan, 4,046,661, Cl. 204-195.00S.

Jones, Allen Jacob, to Agnew, S. J. Furnace roof construction. 4,045,924, Cl. 52-125.000.

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Jones, Howard: *See—*
Dorn, Conrad P.; Jones, Howard; and Jacobus, David P., 4,046,897, Cl. 424-263.000.

Jones, Thomas H.: *See—*
Muzyczko, Thaddeus M.; and Jones, Thomas H., 4,046,577, Cl. 96-115.00R.

Jordan, John W. Box top kite, and method of making same. 4,046,340, Cl. 244-153.00R.

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Jordan, Rodney W.: *See—*
McDanolds, Richard T.; and Jordan, Rodney W., 4,046,055, Cl. 86-1.00B.

Joslyn Mfg. and Supply Co.: *See—*
Lusk, George E., 4,046,958, Cl. 174-73.00R.

Judge, John F. X.; and Salpeter, Jerome, to Technicon Instruments Corporation. Standard for spectral reflectance. 4,047,032, Cl. 250-338.000.

Juds, Richard C.; and Healy, Dennis M., to Andrew Corporation. Connector for coaxial cable with annularly corrugated outer conductor. 4,046,451, Cl. 339-177.00R.

Juillard, Yves; and Riner, Victor, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Looms. 4,046,170, Cl. 139-20.000.

Junker, David W.: *See—*
Yorks, Robert G.; and Junker, David W., 4,047,233, Cl. 361-88.000.

Kabushiki Kaisha Daini Seikosha: *See—*
Miyazaki, Joichi, 4,045,953, Cl. 58-23.00R.
Tanaka, Kojiro, 4,045,951, Cl. 58-23.00R.

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Kumazawa, Shoichiro, 4,045,950, Cl. 58-23.00D.

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Asayama, Kingo, 4,046,205, Cl. 175-292.000.

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Teranishi, Akihiko, 4,046,289, Cl. 222-146.0HE.

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Watanabe, Kazutaka; Shimizu, Misao; and Sugawara, Akihiro, 4,046,959, Cl. 178-68.000.

Kaczmarek, Thomas D.; and Phillips, David C., to Westinghouse Electric Corporation. Device for indicating overheating in generators. 4,046,512, Cl. 23-253.0TP.

Kagerhuber, Franz; and Scheurecker, Werner, to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Arcuate supporting and guiding construction for continuously cast strands. 4,046,188, Cl. 164-282.000.

Kaiser Aluminum & Chemical Corporation: *See—*
Morris, Frank E., 4,045,935, Cl. 52-599.000.

Kajima Corporation: *See—*
Gerwick, Benjamin C., Jr., 4,045,968, Cl. 61-86.000.

Kajino, Yukio: *See—*
Hashimoto, Shinichiro; Goto, Toru; and Kajino, Yukio, 4,046,987, Cl. 219-135.000.

Kalina, Theodore; and Moore, Roger E., to Exxon Research and Engineering Company. Synthesis gas production. 4,046,523, Cl. 48-197.00R.

Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, to L'Oreal. Indoanilines. 4,046,786, Cl. 260-396.00N.

Kambara, Kyosaku, to Tokyo Tekko Kabushiki Kaisha. Cable tray. 4,046,343, Cl. 248-49.000.

Kameswaran, Venkataraman; and Addor, Roger William, to American Cyanamid Company. α-Cyano benzyl-2-naphthaleneacetates. 4,046,799, Cl. 260-465.00D.

Kamiya, Ko: *See—*
Maeda, Fumiaki; Naruse, Seiji; and Kamiya, Ko, 4,046,001, Cl. 73-100.000.

Kanaya, Fumio: *See—*
Yasuda, Hiroshi; and Kanaya, Fumio, 4,047,221, Cl. 358-136.000.

Kando, Akiyoshi, to Yoshida Kogyo Kabushiki Kaisha. Top stop device for slide fasteners. 4,045,845, Cl. 24-205.11F.

Kaneda, Tsugio: *See—*
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.

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Kume, Tsutomu; Kasai, Kazuo; Kaneko, Hidefumi; Sugiyama, Shigeo; and Mithuhashi, Shigeo, 4,047,230, Cl. 360-17.000.

Kannam, Peter Joseph: *See—*
White, Joseph Paul; and Kannam, Peter Joseph, 4,047,196, Cl. 357-55.000.

Kanojia, Ramesh Maganlal, to Ortho Pharmaceutical Corporation. Isolation of utero-evacuant substances from plant extracts. 4,046,882, Cl. 424-195.000.

Kanzaki Paper Manufacturing Company, Ltd.: *See—*
Saito, Toranosuke; Kohno, Jujiro; Tanaka, Daiichiro; and Oda, Shinichi, 4,046,941, Cl. 428-323.000.

Kao Soap Co., Ltd.: *See—*
Yagi, Kouichi; Yamanaka, Makoto; and Fujino, Takashi, 4,046,705, Cl. 252-99.000.

Karl Kroyer St. Anne's Limited: *See—*
Attwood, Brian William; and Hicklin, Dennis Raymond, 4,046,622, Cl. 162-132.000.

Karsten, Carl G.: *See—*
Price, Jerome J.; Karsten, Carl G.; and Paggen, William D., 4,046,976, Cl. 200-61.930.

Kasai, Kazuo: *See—*
Kume, Tsutomu; Kasai, Kazuo; Kaneko, Hidefumi; Sugiyama, Shigeo; and Mithuhashi, Shigeo, 4,047,230, Cl. 360-17.000.

Kashima, Koichi: *See—*
Iwasaki, Yuji; and Kashima, Koichi, 4,046,004, Cl. 73-119.00A.

Kashio, Toshio, to Casio Computer Co., Ltd. Electronic timepiece apparatus. 4,045,952, Cl. 58-23.00R.

Kassai Kabushikikaisha: *See—*
Kassai, Kenzou, 4,046,401, Cl. 280-650.000.

Kassai, Kenzou, to Kassai Kabushikikaisha. Folding baby carriage. 4,046,401, Cl. 280-650.000.

Kassel, Karl-Heinz: *See—*
Glowinski, Wolf; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 4,046,562, Cl. 96-1.50R.

Kasuga, Yukio: *See—*
Akao, Takeshi; Sakasai, Toshio; Matsuyama, Yoshikazu; and Kasuga, Yukio, 4,046,921, Cl. 426-46.000.

Kataoka, Katsuyuki: *See—*
Tsunoda, Shogo; Kataoka, Katsuyuki; and Baba, Toshinori, 4,046,683, Cl. 210-20.000.
Tsunoda, Shogo; and Kataoka, Katsuyuki, 4,046,684, Cl. 210-20.000.

Kataoka, Shoei; Komaniya, Yasuo; Hashizume, Nobuo; Tomizawa, Kazutaka; and Kawashima, Mitsuo, to Agency of Industrial Science & Technology. Semiconductor device. 4,047,199, Cl. 357-3.000.

Katkov, Jury Vasilievich: *See—*
Kholmogorov, Mikhail Vladimirovich; Katkov, Jury Vasilievich; Vorbiev, Grigory Vasilievich; Gusev, Alexandr Mikhailovich; and Nazaretian, Eduard Gurgenovich, 4,045,991, Cl. 72-251.000.

Kato, Katsuhiko: *See—*
Kato, Yasuo; Kato, Katsuhiko; Sugino, Masahiro; Ikegami, Jun; and Harukawa, Junichi, 4,046,724, Cl. 260-9.000.

Kato, Saburo; and Takemoto, Takeshi, to Ricoh Co., Ltd. Automatic reversal mechanism. 4,046,334, Cl. 242-201.000.

Kato, Yasuo; Kato, Katsuhiko; Sugino, Masahiro; Ikegami, Jun; and Harukawa, Junichi, to Toyo Boseki Kabushiki Kaisha. Fireproof polyester composition. 4,046,724, Cl. 260-9.000.

Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, to Sumitomo Chemical Company, Limited. Continuous casting of a polymerizable composition between moving endless belts. 4,046,850, Cl. 264-216.000.

Katsuoka, Ritsu; Kawai, Hisasi; and Morino, Seiji, to Nippon Soken, Inc. Logarithmic function generating system. 4,046,999, Cl. 235-150.530.

Kaule, Walter, to Krautkramer-Branson, Incorporated. Interferometric method and apparatus for sensing surface deformation of a workpiece subjected to acoustic energy. 4,046,477, Cl. 356-109.000.

Kaup, Friedel: *See—*
Warnke, Heinrich; and Kaup, Friedel, 4,046,646, Cl. 204-38.00B.

Kawaguchi, Heizo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Supporting device for supporting a roll film in a camera. 4,047,208, Cl. 354-203.000.

Kawai, Hisasi: *See—*
Katsuoka, Ritsu; Kawai, Hisasi; and Morino, Seiji, 4,046,999, Cl. 235-150.530.

Kawamoto, Tadashi: *See—*
Mizuno, Masayoshi; Kawamoto, Tadashi; and Iida, Kiichi, 4,046,071, Cl. 101-395.000.

Kawamura, Kazumitsu: *See—*
Itoh, Iko; Inoue, Yasuhiko; Ito, Shojiro; and Kawamura, Kazumitsu, 4,046,727, Cl. 260-28.50R.

Kawamura, Naoto, to Canon Kabushiki Kaisha. Retrofocus wide angle objective lens system. 4,046,459, Cl. 350-214.000.

Kawamura, Yuichi; Hirano, Goro; Nagai, Makoto; and Miura, Yasunobu, to Nitto Chemical Industry Co., Ltd. Air-entraining water-reducing agents for cement composition. 4,046,582, Cl. 106-88.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Itoo, Hayami; Takahashi, Noriaki; and Kouda, Hiromasa, 4,046,856, Cl. 423-166.000.

Kawasaki, Shinkichi: *See—*
Wada, Masami; Kodama, Masahiro; and Kawasaki, Shinkichi, 4,047,042, Cl. 250-390.000.

Kawashima, Mitsuo: *See—*
Kataoka, Shoei; Komaniya, Yasuo; Hashizume, Nobuo; Tomizawa, Kazutaka; and Kawashima, Mitsuo, 4,047,199, Cl. 357-3.000.

Kawneer Company, Inc.: *See—*
Papp, Joseph; Meisterheim, Richard A.; and Hubbard, S. Eugene, 4,046,167, Cl. 138-31.000.

Kaye, Paul, to Aquafilter Corporation. Cigarette holder. 4,046,153, Cl. 131-187.000.

Kearns, Tommy C.: *See—*
Vertes, Michael A.; Ronzio, Richard A.; and Kearns, Tommy C., 4,046,852, Cl. 423-58.000.

Kelley, Dale T. Bicycle safety flasher with optional mounting means for other uses. 4,047,150, Cl. 340-84.000.

Kellogg, George Edward, to General Motors Corporation. Disc brake sliding caliper assembly with brake pads of a common pattern, and method of construction. 4,046,232, Cl. 188-73.100.

Kem-O-Kleen, Inc.: *See—*
Hewett, Charley L., 4,046,321, Cl. 239-420.000.
Kemp, Jacob D.; and Sieg, Robert P., to Chevron Research Company. Gasoline production. 4,046,520, Cl. 44-56.000.
Kendall, Arthur Harry; and Rohr, Robert Lewis, to International Business Machines Corporation. Pre-aimed nozzle for ink jet recorder and method of manufacture. 4,047,186, Cl. 346-140.00R.
Kendall Company, The: *See—*
Libman, Gary; Binard, William J.; and Patel, Harish A., 4,046,138, Cl. 128-2.00F.
Kennecott Copper Corporation: *See—*
Crimes, Peter B., 4,046,559, Cl. 75-93.00R.
Kennedy, William S.: *See—*
Clark, Thomas S.; Kennedy, William S.; and Piziali, Robert L., 4,046,131, Cl. 124-71.000.
Kent Feeds, Inc.: *See—*
Sun, Paul L. F., 4,045,912, Cl. 47-58.000.
Kerllenevich, Natalio, to Data General Corporation. I/O Bus transceiver for a data processing system. 4,047,201, Cl. 364-200.000.
Kerllenevich, Natalio; and Clemson, Daniel Michael, to Data General Corporation. I/O bus transceiver for a data processing system. 4,047,246, Cl. 364-200.000.
Kernick, Andress; and Geyer, Manvel A., to Westinghouse Electric Corporation. Elevator system. 4,046,229, Cl. 187-29.00R.
KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co Kommanditgesellschaft: *See—*
Stolzer, Paul, 4,046,041, Cl. 83-210.000.
Keutel, Hans J., to University of Utah. Direct renin assay system and method. 4,046,633, Cl. 195-103.50R.
Key, Paul Franklyn; and Lazzara, Anthony Ross, to Scientific Technology Inc. Color mark detector with pulsed source and synchronous demodulation. 4,047,023, Cl. 250-214.00B.
Khazzam, Joseph N., to Regent Sports Corporation. Tennis racquet. 4,046,377, Cl. 273-73.00G.
Kholmogorov, Mikhail Vladimirovich; Katkov, Jury Vasilievich; Vorbiev, Grigory Vasilievich; Gusev, Alexandr Mikhailovich; and Nazaretian, Eduard Gurgenovich. Automatic forge rolling machine. 4,045,991, Cl. 72-251.000.
Kidde, Gustave E. Ammonium fluoride process for defluorinating phosphoric acids and production of ammonium fluosilicate. 4,046,860, Cl. 423-341.000.
Kiener, Heinz, to SKF Industries, Inc. Wheel bearing unit for motor vehicles. 4,046,433, Cl. 308-191.000.
Kikkoman Shoyu Co., Ltd.: *See—*
Akao, Takeshi; Sakasai, Toshio; Matsuyama, Yoshikazu; and Kasuga, Yukio, 4,046,921, Cl. 426-46.000.
Kikumoto, Ryoji: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.
Kilmer, Bill G.; and Baugh, David F., Jr., to P. R. Mallory & Co., Inc. Coil protector for permanent magnet synchronous motor. 4,047,061, Cl. 310-164.000.
Kim, Chong Chan. Multi-purpose parallel bar exercising apparatus. 4,046,373, Cl. 272-63.000.
King, Reginald F.: *See—*
Vykukal, Hubert C.; King, Reginald F.; and Vallotton, Wilbur C., 4,046,262, Cl. 214-1.0CM.
Kirk, Walter. Yarn minder and organizer. 4,046,333, Cl. 242-137.100.
Kirkby, Paul Anthony, to International Standard Electric Corporation. Double heterostructure lasers having reduced microstress. 4,047,123, Cl. 331-94.50H.
Kirsch, Andrew F.; and Winkler, Charles L., to Westinghouse Electric Corporation. Elevator system. 4,046,227, Cl. 187-29.00R.
Kirschner, Thomas Francis, to RCA Corporation. Stylus cleaning system for disc record player. 4,046,384, Cl. 274-47.000.
Kishino, Takao; Morimoto, Kiyoshi; and Utamura, Yukihiko, to Futaba Denshi Kogyo Kabushiki Kaisha. Multi-digit fluorescent display tube. 4,047,072, Cl. 313-496.000.
Kishino, Takao, to Futaba Denshi Kogyo Kabushiki Kaisha. Multi-digit fluorescent indicating apparatus. 4,047,073, Cl. 313-497.000.
Kishino, Takao; Yamaguchi, Nobuo; and Utamura, Yukihiko, to Futaba Denshi Kogyo Kabushiki Kaisha. Multi-digit fluorescent display tube with cathode filament support. 4,047,074, Cl. 313-497.000.
Kistemaker, Jacob, to Ultracentrifuge Nederland N.V. Apparatus for the stable confinement of an ionized gas column inside a magnetic field. 4,046,527, Cl. 55-100.000.
Kistner, Hermann; and Lehmann, Gunthart, to Maschinenbau Oppenweiler GmbH. Device for conveying and cutting a pile of sheets. 4,046,043, Cl. 83-425.400.
Kitagami, Kazuo; Miyata, Katsuhiko; and Arai, Akihiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Single lens reflex camera. 4,047,206, Cl. 354-152.000.
Kitagawa, Junji: *See—*
Akita, Sigeyuki; and Kitagawa, Junji, 4,047,149, Cl. 340-52.00B.
Kitrell, John V. Reflector device for bicycles. 4,046,397, Cl. 280-289.00R.
Klassen, Horst Willi, to Girling Limited. Sliding caliper disc brake. 4,046,233, Cl. 188-73.300.
Klees, Gerard T.; Meacham, Robert A.; Ruby, Harry M.; and Sich, Edward, to General Motors Corporation. Body mount system for a motor vehicle. 4,046,415, Cl. 296-35.00R.
Klein, Edward, to V-Mark Automation Ltd. Automatic assembly apparatus of syringes. 4,046,616, Cl. 156-559.000.
Klein, Gerald I.: *See—*
Milberger, Walter E.; and Klein, Gerald I., 4,047,046, Cl. 307-101.000.
Klein, Norman E., to Milliken Research Corporation. Endless reinforcement. 4,045,990, Cl. 72-190.000.
Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Holzenberger, Kurt, 4,046,389, Cl. 277-113.000.
Kline, Richard L.; and Fogleman, Floyd F. Airfoil for aircraft having improved lift generating device. 4,046,338, Cl. 244-213.000.
Klingenberg, James C.; Patel, Hiralal V.; and Morse, Philip W., to Weatherhead Company, The. Centrifugal separator with discharge pump. 4,046,315, Cl. 233-4.000.
Klink, Jerome P.: *See—*
Eisenberg, Arnold J.; and Klink, Jerome P., 4,046,329, Cl. 242-18.00G.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Skrivanek, Karl; and Janek, Klaus, 4,046,222, Cl. 184-6.110.
Klosk, Lawrence. Method for collecting, handling and disposal of waste materials. 4,046,271, Cl. 214-152.000.
Kluge, Arthur F.; Untch, Karl G.; and Fried, John H., to Syntex (U.S.A.) Inc. 13-Cis prostaglandin derivatives. 4,046,801, Cl. 560-121.000.
Kluge, Reinhard: *See—*
Kluge, Willi; and Kluge, Reinhard, 4,046,369, Cl. 271-3.100.
Kluge, Willi; and Kluge, Reinhard. Machine for feeding inserts to a separating device. 4,046,369, Cl. 271-3.100.
Knape, Richard S.; and Straub, Robert D., to General Motors Corporation. Fuel injection nozzle assembly with stretch element. 4,046,322, Cl. 239-533.700.
Knipper, Gary L., to Western Electric Company, Incorporated. Indirect memory addressing. 4,047,245, Cl. 364-200.000.
Knodler, Dietrich: *See—*
Ott, Anton; Ehrlinger, Friedrich; Knodler, Dietrich; and Zdansevicius, Roland, 4,046,031, Cl. 74-764.000.
Kobayakawa, Masaki; and Akahane, Fumitake, to Nippon Electric Kagoshima, Limited. Flat display panel comprising an envelope including a substrate having terminal-receiving grooves. 4,047,066, Cl. 313-217.000.
Kobayashi, Hideo: *See—*
Takaoka, Sabro; Shinoda, Akira; and Kobayashi, Hideo, 4,046,204, Cl. 175-76.000.
Kobayashi, Kazumitsu: *See—*
Izumi, Takichiro; Chiba, Shigeo; and Kobayashi, Kazumitsu, 4,046,136, Cl. 126-271.000.
Kobayashi, Kazuo; Ogawa, Ichitaro; Honda, Hidemasa; and Matsushita, Yasuhiro, to Director-General of the Agency of Industrial Science and Technology. Process for the production of shaped articles of high density graphite. 4,046,863, Cl. 423-448.000.
Kobayashi, Yoshichika: *See—*
Akutsu, Hidezo; Iwama, Katsuaki; Saito, Naoki; Takagawa, Masanori; Kobayashi, Yoshichika; and Atsumi, Tamisuke, 4,047,069, Cl. 313-487.000.
Ohkubo, Yoshio; and Kobayashi, Yoshichika, 4,046,595, Cl. 148-1.500.
Kobe Steel Ltd.: *See—*
Okuda, Naoki; and Tanaka, Kazuo, 4,046,988, Cl. 219-137.00R.
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.
Kobylarz, Lawrence P.; and Mack, Ronald H., to Burroughs Corporation. Velocity controlled manual movement credit card reader. 4,047,229, Cl. 360-2.000.
Kodama, Masahiro: *See—*
Wada, Masami; Kodama, Masahiro; and Kawasaki, Shinkichi, 4,047,042, Cl. 250-390.000.
Kohata, Teruo: *See—*
Matsuo, Tatsuki; and Kohata, Teruo, 4,046,525, Cl. 55-59.000.
Kohn, Leo S.: *See—*
Torossian, Kevork A.; and Kohn, Leo S., 4,046,938, Cl. 428-285.000.
Kohno, Jujiro: *See—*
Saito, Toranosuke; Kohno, Jujiro; Tanaka, Daiichiro; and Oda, Shinichi, 4,046,941, Cl. 428-323.000.
Koizumi, Toshimichi, to Olympus Optical Co., Ltd. Objective for video disks. 4,046,460, Cl. 350-216.000.
Kolb, Werner Bernard, to Turbo-Lufttechnik GmbH. Lubrication of fan blade bearings. 4,046,486, Cl. 416-157.00R.
Kolberg, Reiner: *See—*
Rosskamp, Gunter; Kolberg, Reiner; Gunzel, Peter; and Porep, Hans-Jurgen, 4,046,146, Cl. 128-266.000.
Kollar, John. Process for the industrial production of ethylene oxide and aromatic acid. 4,046,782, Cl. 260-348.320.
Komaniya, Yasuo: *See—*
Kataoka, Shoei; Komaniya, Yasuo; Hashizume, Nobuo; Tomizawa, Kazutaka; and Kawashima, Mitsuo, 4,047,199, Cl. 357-3.000.
Komatsu, Michiyasu: *See—*
Ishii, Takashi; Nishida, Katsutoshi; Komatsu, Michiyasu; and Tsuge, Akihiko, 4,046,580, Cl. 106-55.000.
Komatsu, Tokuji, to Tsudakoma Kogyo Kabushiki Kaisha. Apparatus for sizing a yarn sheet. 4,046,099, Cl. 118-6.000.
Komatsu, Toshiaki: *See—*
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

Kominami, Yasuo: *See*—
Sakamoto, Yoshio; and Kominami, Yasuo, 4,047,118, Cl. 330-22.000.
Komiya, Kunihiko: *See*—
Takechi, Hiroshi; Abe, Mitsunobu; Usuda, Matsuo; and Komiya, Kunihiko, 4,046,597, Cl. 148-12.00R.
Komiya, Osamu, to Olympus Optical Co., Ltd. Instrument for removing a foreign substance from the body cavity of human being. 4,046,149, Cl. 128-328.000.
Komiya, Yoshio: *See*—
Tarui, Yasuo; Sakamoto, Tsunenori; and Komiya, Yoshio, 4,046,594, Cl. 136-89.0SJ.
Kompelien, Arlon D., to Honeywell Inc. U.V. detector. 4,047,038, Cl. 250-372.000.
Kondur, Nicholas, Jr., to LRC, Inc. Serial impact calculator printer. 4,046,246, Cl. 197-160.000.
Konig, Wilfried: *See*—
Dahn, Ursula; Hagenmaier, Hanspaul; Hohne, Helmut; Konig, Wilfried; Scheinpflug, Hans; and Zahner, Hans, 4,046,881, Cl. 424-181.000.
Kontomerkos, Andrew, to International Telephone and Telegraph Corporation. Toll restrictor for a time division telecommunication system. 4,046,965, Cl. 179-18.0DA.
Koppers Company, Inc.: *See*—
Lacona, Joseph, 4,046,739, Cl. 260-75.00M.
Leston, Gerd, 4,046,818, Cl. 260-627.00G.
Korby, Leonard A.; and Heard, Norris K. Cigarette pack. 4,046,252, Cl. 206-95.000.
Korelin, Vladimir Fedorovich: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.
Kosaric, Naim: *See*—
Zajic, James Edward; and Kosaric, Naim, 4,046,678, Cl. 209-166.000.
Kottmann, Alfred: *See*—
Bergmann, Ewald; Barcis, Alfred; Dangelmaier, Karl; and Kottmann, Alfred, 4,046,264, Cl. 214-8.000.
Koubek, Michael; and Mallon, Dietmar, to Siemens Aktiengesellschaft. Circuit arrangement for regulating the amplitude of a sawtooth generator. 4,047,052, Cl. 307-228.000.
Koubek, Michael, to Siemens Aktiengesellschaft. Single tube color television camera with color strip filters. 4,047,200, Cl. 358-47.000.
Kouda, Hiromasa: *See*—
Itoo, Hayami; Takahashi, Noriaki; and Kouda, Hiromasa, 4,046,856, Cl. 423-166.000.
Kozlov, Jury Stepanovich: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.
Kozlowski, John H., to Crown Zellerbach Corporation. Method of preparing a disalt of 3,3-sulfonylbis (6-hydroxybenzene sulfonic acid). 4,046,806, Cl. 260-512.00C.
Kraft, Inc.: *See*—
Perry, George S., 4,046,313, Cl. 206-611.000.
Kraftwerk Union Aktiengesellschaft: *See*—
Puchelt, Manfred; and Seidelberger, Hartmut, 4,046,632, Cl. 176-87.000.
Winkler, Franz; and Helf, Harald, 4,046,626, Cl. 176-38.000.
Krajewski, Ignacy, to International Computers Limited. Multilayer printed circuit boards. 4,047,132, Cl. 333-84.00M.
Kramer, Steven G. Surgical trays. 4,046,254, Cl. 206-370.000.
Krautkramer-Branson, Incorporated: *See*—
Kaule, Walter, 4,046,477, Cl. 356-109.000.
Kreidl Chemico Physical K.G.: *See*—
Ress, Thomas I.; and Nolde, George V., 4,047,068, Cl. 313-359.000.
Kreimer, Vladimir Isakovich; Tishkov, Anatoly Yakovlevich; Grigoriev, Vitaly Markovich; Gendlina, Ljudmila Ivanovna; and Zimonin, Leonid Vasilievich. Vibration conveyor apparatus having cambered trough. 4,046,249, Cl. 198-758.000.
Krenzer, John, to Velsicol Chemical Corporation. Dialkyl acetals of anilinoacetaldehydes. 4,046,554, Cl. 71-118.000.
Krenzer, John; and Wu, Chin Ching, to Velsicol Chemical Corporation. 1-Thiazolyl-5-pyridylcarbonyloxyimidazolidinones. 4,046,768, Cl. 260-294.80D.
Kresge, James S., to General Electric Company. Process for improving the stability of sintered zinc oxide varistors. 4,046,847, Cl. 264-61.000.
Krezanoski, Joseph Zenon, to Flow Pharmaceuticals, Inc. Contact lens cleaning composition. 4,046,706, Cl. 252-106.000.
Krizan, Bradford J., to Liberty Carton Co. Security tote box. 4,046,312, Cl. 229-45.00R.
Krohn, Antonin: *See*—
Hassall, Cedric Herbert; Johnson, William Henry; Krohn, Antonin; Smithen, Carey Ernest; and Thomas, William Anthony, 4,046,751, Cl. 260-112.50R.
Kruk, Anthony Richard; Bryant, Richard; and Harper, Samuel, to Canadian Pacific Limited. Truck bolster lifting device. 4,045,855, Cl. 29-252.000.
Krupp, Joseph: *See*—
Merker, George; Navi, Menashe; and Krupp, Joseph, 4,046,367, Cl. 270-55.000.
Kubersky, Hans Peter, to Henkel & Cie GmbH. Developer-coupler hair dyes based on alkoxy-triamino-pyrimidines. 4,046,503, Cl. 8-10.200.
Kucheck, Leo; and Crankshaw, Michael, to Label-Aire Inc. Matrix label applicator. 4,046,613, Cl. 156-249.000.
Kuckertz, Herbert, to Hoechst Aktiengesellschaft. Process for preparing acetic anhydride. 4,046,807, Cl. 260-549.000.
Kudara, Hajime: *See*—
Matsuda, Sumio; and Kudara, Hajime, 4,046,791, Cl. 260-429.700.
Kuehn, Rainhard: *See*—
Dennhoven, Manfred; Kunze, Claus; and Kuehn, Rainhard, 4,047,035, Cl. 250-355.000.
Kuelzer, Peter: *See*—
Reier, Richard; and Kuelzer, Peter, 4,046,303, Cl. 228-173.000.
Kuhn, Lawrence: *See*—
Bassous, Ernest; and Kuhn, Lawrence, 4,047,184, Cl. 346-75.000.
Kulczycki, Karol, to Barber-Colman Company. Triaxial weaving machine with heddle shedding means. 4,046,173, Cl. 139-48.000.
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, to Hitachi, Ltd. Irregular ferroelectric element devised for motion of plural domain-walls. 4,046,455, Cl. 350-150.000.
Kumazawa, Shoichiro, to Kabushiki Kaisha Seikosha. Control apparatus for an intermittently rotated wheel. 4,045,950, Cl. 58-23.00D.
Kume, Tsutomu; Kasai, Kazuo; Kaneko, Hidefumi; Sugiyama, Shigeo; and Mithuhashi, Shigeo, to Ricoh Co., Ltd. Method and apparatus for transferring magnetic signal from a master sheet to copy sheets. 4,047,230, Cl. 360-17.000.
Kunica, Serge: *See*—
Root, Ernest F.; Kunica, Serge; and Simmons, Harry M., 4,046,135, Cl. 126-271.000.
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Possible vehicle running distance indication. 4,046,998, Cl. 235-150.210.
Kuntz, Hillard L.: *See*—
Mitsche, Roy T.; Kuntz, Hillard L.; and Hayes, John C., 4,046,713, Cl. 252-455.00Z.
Kunze, Claus: *See*—
Dennhoven, Manfred; Kunze, Claus; and Kuehn, Rainhard, 4,047,035, Cl. 250-355.000.
Kuo, James C., to Mobil Oil Corporation. Method for upgrading Fischer-Tropsch synthesis products. 4,046,830, Cl. 260-676.00R.
Kuo, James C., to Mobil Oil Corporation. Method for upgrading products of Fischer-Tropsch synthesis. 4,046,831, Cl. 260-676.00R.
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Kuonen, Frederick L.; and Boughton, Edward M., to TRW Inc. Apparatus for thermal deposition of metal. 4,046,100, Cl. 118-8.000.
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Fukushima, Osamu, 4,046,504, Cl. 8-17.000.
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Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,046,670, Cl. 208-48.0AA.
Kurosaki, Teikichi: *See*—
Takino, Masuichi; Kurosaki, Teikichi; and Odaka, Munehiko, 4,046,893, Cl. 424-251.000.
Kurz-Beerli, Elizabeth, executrix, also known as Elizabeth Kurz Chinoy: *See*—
Ferro, Armand P.; and Kurz, Bruno F., deceased, 4,047,220, Cl. 357-48.000.
Kurz, Bruno F., deceased: *See*—
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Hirasawa, Kazuhiko; and Okamoto, Yasuo, 4,046,650, Cl. 204-67.000.
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Meng, John C.; and Driessen, Gerald J., 4,046,923, Cl. 426-130.000.
L. Schuler GmbH: *See*—
Bergmann, Ewald; Barcis, Alfred; Dangelmaier, Karl; and Kottmann, Alfred, 4,046,264, Cl. 214-8.000.
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Kucheck, Leo; and Crankshaw, Michael, 4,046,613, Cl. 156-249.000.

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Lacona, Joseph, to Koppers Company, Inc. Process for reducing the processing time in the production of polyesters. 4,046,739, Cl. 260-75.00M.

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Ludin, Ludwig; and Laing, Nikolaus, 4,047,062, Cl. 310-216.000.

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Fowler, John T., 4,047,168, Cl. 340-310.00R.

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Lane, Richard A.; and Fronek, Donald K., to United States of America, Army. Digital detector. 4,047,114, Cl. 328-140.000.

Lang, Gregor L. Solenoid fluid valves. 4,046,351, Cl. 251-129.000.

Lange, Georg, to Thyssen Purofe GmbH. Method of direct reduction of iron ore. 4,046,555, Cl. 75-35.000.

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Laporte Industries Limited: *See—*
Dunderdale, John, 4,046,854, Cl. 423-77.000.
Robinson, Michael, 4,046,853, Cl. 423-77.000.

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Lasiter, Glennis W. Wheel balancing apparatus. 4,046,018, Cl. 73-482.000.

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Laurent, Estan, to Siemens Aktiengesellschaft. Calibrating impulse generator for an impulse-shaping element. 4,047,050, Cl. 307-108.000.

Lawler, John F.: *See—*
Miller, G. Kirby; and Lawler, John F., 4,047,166, Cl. 340-261.000.

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Myers, David C., 4,046,319, Cl. 236-34.500.

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Layman, William S.: *See—*
Watkins, Richard Kenneth; and Layman, William S., 4,046,000, Cl. 73-95.000.

Lazzara, Anthony Ross: *See—*
Key, Paul Franklyn; and Lazzara, Anthony Ross, 4,047,023, Cl. 250-214.00B.

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Gabriele, Leonard A., 4,045,987, Cl. 72-84.000.

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Boehringer, John R.; and Lecky, John, 4,046,014, Cl. 73-421.50R.

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Lee, Walter. Cabinet for a fire extinguisher with locking closure member. 4,046,439, Cl. 312-138.00R.

Lee, Walter F., to J. N. Johnson Company, Inc. Cabinet with lock release. 4,046,412, Cl. 292-200.000.

Leensvaart, John R. Mounting device for vehicle shock absorber. 4,046,480, Cl. 403-398.000.

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Kistner, Hermann; and Lehmann, Gunthart, 4,046,043, Cl. 83-425.400.

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Leigh Products, Inc.: *See—*
Malott, Richard C., 4,045,928, Cl. 52-199.000.

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Gysling, Henry J.; and Lelental, Mark, 4,046,569, Cl. 96-48.0PD.

Lelong, Marion Pasteur. Rotatable swing. 4,046,375, Cl. 272-85.000.

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Bernstein, Seymour; Lenhard, Robert Herman; and Heller, Milton David, 4,046,805, Cl. 260-506.000.

Lenz, Herman N., to Teledyne Industries, Inc. Turbine blade indexing assembly. 4,046,487, Cl. 416-208.000.

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Leston, Gerd, to Koppers Company, Inc. Purification of 3,5-dialkylphenols. 4,046,818, Cl. 260-627.00G.

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Sextro, Gunter; Burg, Karlheinz; Leugering, Hans Joachim; Schlaf, Helmut; and Heller, Alwin, 4,046,738, Cl. 260-67.0FP.

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Johnston, Gordon Francis; Martin, Alexander; and Tomlinson, Alan Digby, 4,046,717, Cl. 252-546.000.

Lever, Ray Clarence; and Wilkus, Edward Vincent, to General Electric Company. Method of compounding thermo-plastic polymeric materials and fillers and extruding onto electrical conductors. 4,046,849, Cl. 264-174.000.

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Levoy, Larry. Direct thermal-electric conversion for geothermal energy recovery. 4,047,093, Cl. 322-2.00R.

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Li, Jorge P.: *See—*
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Bjorkholm, John Ernst; and Liao, Paul Foo-Hung, 4,047,026, Cl. 250-251.000.

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Miller, James W.; and Zarecky, Frederick D., 4,046,549, Cl. 65-182.00R.
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Krizan, Bradford J., 4,046,312, Cl. 229-45.00R.

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DeLuca, Carlo J., 4,046,141, Cl. 128-2.10R.

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Morz, Gunter, 4,047,128, Cl. 333-11.000.
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Lim, Teong C.; Tarakci, Umit; and Vasile, Carmine F., to Rockwell International Corporation. Surface acoustic wave filter. 4,047,130, Cl. 333-72.000.

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Cosco, Robert J.; Lima, Joseph V.; and Soucy, Frank, 4,047,064, Cl. 313-201.000.

Limburg, William W.: *See—*
Pearson, James M.; Williams, David J.; and Limburg, William W., 4,046,563, Cl. 96-1.50R.

Linda, Neil A.: *See—*
Zinnes, Harold; and Linda, Neil A., 4,046,778, Cl. 260-326.340.

Lindow, Steven E.: *See—*
Arny, Deane C.; and Lindow, Steven E., 4,045,910, Cl. 47-2.000.

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Maeda, Fumiaki; Naruse, Seiji; and Kamiya, Ko, 4,046,001, Cl. 73-100.000.

Lipe-Rollway Corporation: *See—*
Root, Robert S.; Taylor, Frederick P.; and MacKendrick, William J., 4,046,237, Cl. 192-13.00R.

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Liston, Thomas V., to Chevron Research Company. Lubricating oil composition. 4,046,702, Cl. 252-33.400.

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Erickson, Fred William; and Nakahara, Roy Hiroshi, 4,047,049, Cl. 307-157.000.

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Wu, Yao Hua; and Lobeck, Walter G., Jr., 4,046,891, Cl. 424-248.400.

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Gruffaz, Max; and Locatelli, Jean-Louis, 4,046,835, Cl. 260-857.0PA.

Lockformer Company, The: *See—*
Ryan, Marshall John, 4,045,989, Cl. 72-133.000.

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Lomas, James Arthur, III; Lee, Ronald La Verne; and Holland, Andrew Macdonald, to Coast Catamaran Corporation. Method and apparatus for securing pylon and deck to the hull of a sailing vessel. 4,046,091, Cl. 114-39.000.

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Charamella, John Barrie; Long, John Warren; and Stone, Jerry Lloyd, 4,046,476, Cl. 355-77.000.

Long, Leslie T. High performance ignition circuit. 4,046,124, Cl. 123-148.00E.

Long-Lok Fasteners Corporation: *See—*
Bowman, James Lee, 4,046,106, Cl. 118-620.000.

Loos, Herbert; Seitz, Max; and Erhardt, Manfred, to Carl Hurth Maschinen- und Zahnradfabrik. Gear grinding machine. 4,045,917, Cl. 51-123.00G.

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Hannibal, Alan J., 4,045,948, Cl. 57-129.000.

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Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,046,786, Cl. 260-396.00N.

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Louis, Hans; and Leverkus, Eberhard. Machine for straightening wires. 4,046,177, Cl. 140-147.000.

Loveland, Malcolm W.; and Matthews, Rudolph, to Atlas Pacific Engineering Company. Machine for cutting pears into segments. 4,046,067, Cl. 99-543.000.

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Capeling, Thomas W.; and Lovins, Robert G., 4,046,090, Cl. 113-1.00K.

Lovisek, Louis J., to Industrial Fasteners Corporation. Thread forming screw. 4,046,051, Cl. 85-47.000.

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Gabby, John Lester; Corbin, Dennis Dale; and Lowe, Jack Bruner, 4,046,874, Cl. 424-73.000.

Lowski, Dieter: *See—*
Boie, Immo; and Lowski, Dieter, 4,046,575, Cl. 96-100.00N.

LRC, Inc.: *See—*
Kondur, Nicholas, Jr., 4,046,246, Cl. 197-160.000.

Lucas Electrical Company Limited, The: *See—*
Harris, Mervyn George, 4,047,018, Cl. 240-7.10R.
Moore, John Howard, 4,046,113, Cl. 123-32.0EA.

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Hoekstra, Joop Frans; Lumby, Donovan Harold; and Vork, William Duncan, 4,046,287, Cl. 222-16.000.

Lummus Company, The: *See—*
Schoonman, Willem, 4,045,961, Cl. 60-686.000.

Lusk, George E., to Joslyn Mfg. and Supply Co. Cable termination connector assembly and method. 4,046,958, Cl. 174-73.00R.

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Lyon, James R.: *See—*
Wilkinson, Robert M.; and Lyon, James R., 4,046,935, Cl. 428-182.000.

Lyons, Richard B.: *See—*
Gorton, Howard Byron; and Lyons, Richard B., 4,045,982, Cl. 70-90.000.

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Harbulak, Edward P., 4,046,647, Cl. 204-43.00T.

MacAfee, James E., to American Motors Corporation. Support assembly for forwardly shiftable vehicle seat. 4,046,349, Cl. 248-424.000.

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Weaver, Kenneth E., 4,047,044, Cl. 250-402.000.

MacIntyre, Allan L.: *See—*
Montagno, William J.; and MacIntyre, Allan L., 4,046,352, Cl. 254-29.00R.

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Kobylarz, Lawrence P.; and Mack, Ronald H., 4,047,229, Cl. 360-2.000.

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Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Mackay, Angus Campbell, 4,046,811, Cl. 260-578.000.

MacKay, Patrick W.: *See—*
Celada, Juan; and MacKay, Patrick W., 4,046,556, Cl. 75-35.000.

MacKendrick, William J.: *See—*
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Mackley Ace Limited: *See—*
Cook, Robert Alastair, 4,046,216, Cl. 180-127.000.

MacPhee, Colin A. A., to Federal Pacific Electric Co. Ground leakage current protection system. 4,047,079, Cl. 361-45.000.

Macri, Antonio: *See—*
Deinhammer, Wolfgang; Wick, Manfred; and Macri, Antonio, 4,046,792, Cl. 260-429.700.

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Ozaki, Nobuo, 4,046,025, Cl. 74-501.00R.

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Lehnert, Gunther; Maertens, Dieter; Pampus, Gottfried; and Witte, Josef, 4,046,710, Cl. 252-429.00B.

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Rock, Erich; and Mages, Bernhard, 4,045,841, Cl. 16-129.000.

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Castleman, Cordell V., 4,046,970, Cl. 179-84.00L.

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Murdoch, Robert N.; Travaglio, Vincent M.; and Magnifico, Michael L., 4,046,083, Cl. 108-107.000.

Magnuson, Allen H. Roll, pitch, and heave stabilization device for air-cushion-borne vehicles. 4,046,217, Cl. 180-126.000.

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Feess, Erich; and Maier, Hans-Peter, 4,046,506, Cl. 8-21.00R.

Malaney, Frank N.: *See—*
Burden, David M.; and Malaney, Frank N., 4,047,143, Cl. 337-239.000.

Mallon, Dietmar: *See—*
Koubek, Michael; and Mallon, Dietmar, 4,047,052, Cl. 307-228.000.

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Mancinelli, Anthony R.: *See—*
Mancinelli, Ralph A.; and Mancinelli, Anthony R., 4,046,098, Cl. 116-56.000.

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Eichorn, Roger H., deceased; Silverberg, Morton; and Mandrino, Russell J., executor, 4,046,472, Cl. 355-14.000.

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Dlugos, Daniel F.; and Manduley, Flavio M., 4,047,007, Cl. 235-151.330.

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Manghisi, Elso; and Salimbeni, Aldo, to Instituto Luso Farmaco D'Italia S.r.l. Esters and amides of 3-aryl-1,4 benzodioxan-2-carboxylic acids. 4,046,762, Cl. 544-148.000.

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Marquis, Gerald L., to Dresser Industries, Inc. Method and apparatus for measuring the thermal neutron absorption rate in earth formations. 4,046,764, Cl. 250-262.000.

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Pfeiffer, Heinrich, 4,046,500, Cl. 425-407.000.

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Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,046,765, Cl. 260-288.0CE.

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Fukuma, Nobuo; and Matsubara, Hideyuki, 4,045,920, Cl. 51-165.880.

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Sakamoto, Yoichi, 4,047,112, Cl. 325-455.000.
Sumita, Isao, 4,046,704, Cl. 252-63.200.
Yamaguti, Namio, 4,047,224, Cl. 358-166.000.
Yoshida, Akihiko; and Nishino, Atsushi, 4,046,645, Cl. 204-37.00R.

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Ohkubo, Yoshio; and Kobayashi, Yoshichika, 4,046,595, Cl. 148-1.500.

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Chaudhari, Praveen; Cuomo, Jerome John; and Matthews, John Wauchope, 4,046,618, Cl. 156-603.000.

Matthews, Rudolph: *See*—
Loveland, Malcolm W.; and Matthews, Rudolph, 4,046,067, Cl. 99-543.000.

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Maurer, Barbara V.: *See*—
Haugwitz, Rudiger D.; and Maurer, Barbara V., 4,046,908, Cl. 424-273.00R.

Maurer, Bruce E.: *See*—
Fairchild, Jack E.; Maurer, Bruce E.; and Woods, Robert L., 4,046,489, Cl. 416-223.00R.

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Mitterhummer, Gerhard; Peltz, Hanns-Heinz; Mayer, Heinrich; and Conzelmann, Fritz, 4,045,863, Cl. 29-588.000.

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LaRocca, James J.; and Mazur, Richard A., 4,047,003, Cl. 235-151.110.

Mazzini, Leone, to Castel Mac S.p.A. Ice-making machine. 4,045,979, Cl. 62-352.000.

McAllister, Alex J.: *See*—
McKee, Kenneth E.; and McAllister, Alex J., 4,046,021, Cl. 74-110.000.

McCaffrey, Terence; Raza, Hassan; and Williams, Bruce C., to Fairchild Camera and Instrument Corporation. High-gain, high-voltage transistor for linear integrated circuits. 4,047,217, Cl. 357-34.000.

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McCauley, Herbert J., to McCauley Metal Products, Inc. Fender flanging apparatus. 4,045,993, Cl. 72-387.000.
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McCauley, Herbert J., 4,045,993, Cl. 72-387.000.
McClanahan, Edwin D.; and Moss, Ronald W., to United States of America, Energy Research and Development Administration. Device for providing high-intensity ion or electron beam. 4,046,666, Cl. 204-298.000.
McClelland, Etheridge R.: *See*—
White, Thomas J.; Spence, Henry L.; and McClelland, Etheridge R., 4,045,940, Cl. 53-26.000.
McClelland, Harold H.: *See*—
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McDanolds, Richard T.; and Jordan, Rodney W., to United States of America, Army. Apparatus for safely neutralizing explosive devices. 4,046,055, Cl. 86-1.00B.
McDonald, Wallace. Key holder. 4,045,984, Cl. 70-456.00R.
McDonald, William M. Sanitary handle. 4,046,508, Cl. 21-77.000.
McDonnell Douglas Corporation: *See*—
Morrison, Hadley F., 4,046,277, Cl. 220-1.500.
McEvoy Oilfield Equipment Co.: *See*—
Bonds, James Vaull, 4,046,405, Cl. 285-3.000.
McFarlane, Richard H. Catheter placement assembly. 4,046,144, Cl. 128-214.400.
McGhee, Anna. Belt holster purse assembly. 4,046,296, Cl. 224-26.00D.
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Anderson, Richard M.; McGill, Robert S., III; and Ramsey, Robert W., 4,045,973, Cl. 62-158.000.
McHugh, James D., to General Electric Company. Bearing sump cooling arrangement. 4,046,223, Cl. 184-6.110.
McKee, Kenneth E.; and McAllister, Alex J., to International Harvester Company. Free floating actuating linkage. 4,046,021, Cl. 74-110.000.
McKeever, Bruce T.: *See*—
Sloane, Edwin A.; McKeever, Bruce T.; and Wong, Eugene, 4,047,002, Cl. 235-151.300.
McKenzie, Roland W., to City Tank Corporation. Control assembly for refuse vehicle. 4,046,269, Cl. 214-83.300.
McKerrow, George C.; Pelletier, Albert; and Newman, Christopher J., to Noranda Mines Limited. Process for controlled slow cooling of non-ferrous smelting slags. 4,046,323, Cl. 241-23.000.
McLaughlin, Thomas D.: *See*—
Altman, Richard M.; and McLaughlin, Thomas D., 4,047,207, Cl. 354-155.000.
Moskovich, Jacob; Wiese, Gary E.; Altman, Richard M.; and McLaughlin, Thomas D., 4,047,222, Cl. 354-155.000.
McNamara, Albert C., Jr., to Esquire, Inc. Emergency lighting system for gaseous discharge lamps. 4,047,076, Cl. 315-88.000.
McNeil Corporation: *See*—
Tallon, James I., 4,046,260, Cl. 211-24.000.
McNeil Laboratories, Incorporated: *See*—
Rasmussen, Chris Royce; Gardocki, Joseph Francis; and Plampin, James Nelson, 4,046,909, Cl. 424-274.000.
Schwartz, Norman; and Mohrbacher, Richard J., 4,046,763, Cl. 260-250.00B.
McQueary, Hobert O.: *See*—
Shoemaker, Philip D.; and McQueary, Hobert O., 4,046,952, Cl. 428-423.000.
Meacham, Robert A.: *See*—
Klees, Gerard T.; Meacham, Robert A.; Ruby, Harry M.; and Sich, Edward, 4,046,415, Cl. 296-35.00R.
Mead Corporation, The: *See*—
Muller, Rolf, 4,045,942, Cl. 53-48.000.
Parsonage, Harry N., 4,045,839, Cl. 15-302.000.
Watkins, Richard Kenneth; and Layman, William S., 4,046,000, Cl. 73-95.000.
Mead Johnson & Company: *See*—
Gabby, John Lester; Corbin, Dennis Dale; and Lowe, Jack Bruner, 4,046,874, Cl. 424-73.000.
Wu, Yao Hua; and Lobeck, Walter G., Jr., 4,046,891, Cl. 424-248.400.
Meador, Lawrence Dean. Severing and cauterizing instrument for use in severing tails and navel cords. 4,046,148, Cl. 128-303.100.
Measurement Systems, Incorporated: *See*—
Goroski, Robert D., 4,046,005, Cl. 73-133.00R.
Mechanisms, Inc.: *See*—
Morse, Robert L., 4,046,361, Cl. 267-139.000.
Medio, Grace E.: *See*—
Green, Cyril Robert, 4,046,013, Cl. 73-422.00R.
Medio, Mario D.: *See*—
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Medtronic, Inc.: *See*—
Rose, Maria M., 4,046,151, Cl. 128-404.000.
Meehan, David H., to Zenith Radio Corporation. Pulse differentiating high voltage shutdown circuit. 4,047,078, Cl. 315-411.000.
Meguro, Kanji: *See*—
Kuwada, Yutaka; Tawada, Hiroyuki; and Meguro, Kanji, 4,046,772, Cl. 260-308.00R.
Mehal, Edward W.: *See*—
Paxton, Grady W., Jr.; Howeth, Bobby W.; Mehal, Edward W.; Cashion, William F.; and Cashion, Charles M., 4,047,045, Cl. 250-551.000.
Meiner, Roger D.; Haines, James M.; and Alsberg, Henry, to Richardson Company, The. Floor finish composition and components thereof. 4,046,726, Cl. 260-27.00R.
Meininger, Fritz; and Springer, Hartmut, to Hoechst Aktiengesellschaft. Water-soluble naphyhyl-azo-pyrazolone fiber reactive dyestuffs. 4,046,754, Cl. 260-162.000.
Meisterheim, Richard A.: *See*—
Papp, Joseph; Meisterheim, Richard A.; and Hubbard, S. Eugene, 4,046,167, Cl. 138-31.000.
Mello, Raymond M.: *See*—
Pollono, Louis P.; and Mello, Raymond M., 4,046,169, Cl. 138-106.000.
Melnyk, John. Process for semi-automated production of mammalian cell slides. 4,046,927, Cl. 427-2.000.
Mendoza-Orozco, Hector. Free-wheeling mechanism for bicycles. 4,046,238, Cl. 192-45.000.
Meng, John C.; and Driessen, Gerald J., to L. D. Schreiber Cheese Co., Inc. Package with staggered product slices and process for producing the same. 4,046,923, Cl. 426-130.000.
Mentel, Jurgen: *See*—
Hertz, Walter; Stroh, Jan; and Mentel, Jurgen, 4,046,979, Cl. 200-148.00A.
Mentrup, Anton; Schromm, Kurt; Renth, Ernst-Otto; and Traunecker, Werner, to Boehringer Ingelheim GmbH. 1-(M-alkanoyloxy-phenyl)-1-hydroxy-2-(N-lower alkyl-amino)-ethanes and salts thereof. 4,046,913, Cl. 424-311.000.
Mercer, Donald W. Assay of isoenzymes by ion exchange chromatography. 4,046,634, Cl. 195-103.50R.
Mercik, Henry J., Jr.: *See*—
Armstrong, Lee R.; and Mercik, Henry J., Jr., 4,046,003, Cl. 73-118.000.
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Cohen, Edward M.; and Oberholtzer, Earl R., 4,046,804, Cl. 260-501.210.
Dorn, Conrad P.; Jones, Howard; and Jacobus, David P., 4,046,897, Cl. 424-263.000.
Fisher, Michael H.; and Wu, Mu Tsu, 4,046,753, Cl. 260-158.000.
Igoe, Robert S., 4,046,925, Cl. 426-573.000.
Jones, Howard; and Frankshun, Robert A., 4,046,760, Cl. 260-239.55R.
Shen, Tsung-Ying; Li, Jorge P.; and Dorn, Conrad P., Jr., 4,046,905, Cl. 424-272.000.
Mercz, Jeno: *See*—
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,046,765, Cl. 260-288.0CE.
Merker, George; Navi, Menashe; and Krupp, Joseph, to American Newspaper Publishers Association, Incorporated. Modified high speed paper inserting apparatus and method. 4,046,367, Cl. 270-55.000.
Merkert, Clifton S.: *See*—
Henle, Richard G.; Merkert, Clifton S.; and Thomas, David C., 4,046,023, Cl. 74-242.800.
Merle, Michel, to Andrew Corporation. Continuous corrugated waveguide and method of producing the same. 4,047,133, Cl. 333-95.00A.
Merlin Gerin: *See*—
Badon, Aime, 4,046,978, Cl. 200-148.00A.
Merten, Josef: *See*—
Adelmann, Siegfried; Margotte, Dieter; Merten, Josef; and Vernaleken, Hugo, 4,046,836, Cl. 260-860.000.
Mertz, John R., to GAF Corporation. Processing solution for use as photographic developer bath and replenisher therefor. 4,046,571, Cl. 96-66.0HD.
Mesek, Frederick K.; and Repke, Virginia L., to Johnson & Johnson. Absorbent bed pad. 4,045,833, Cl. 5-335.000.
Messerschmidt, Friedrich, to Robert Bosch G.m.b.H. Securing means for fuel injection nozzles. 4,046,478, Cl. 403-262.000.
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Cornelius, Gerhard; Marschner, Friedemann; Supp, Emil; and Varlam, Toma, 4,045,960, Cl. 60-648.000.
Metcalf, Eric: *See*—
Ley, Anthony John; and Metcalf, Eric, 4,047,053, Cl. 307-238.000.
Metcalfe, Richard T.; Granitsas, George A.; and Elliott, Edgar H., to American Optical Corporation. Process for producing spectacle frames using an age-hardenable nickel-bronze alloy. 4,046,596, Cl. 148-2.000.
Metzler, Richard Bruce: *See*—
Johnson, Gordon Carlton; and Metzler, Richard Bruce, 4,046,930, Cl. 427-387.000.
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Landgraf, Helmut; Forster, Herbert; and Meurer, Karl, 4,046,603, Cl. 148-144.000.
Meybeck, Jacques; Mueller, Curt; and Mueller, Fred, to Sandoz Ltd. 2-Optionally substituted alkyl-and phenylsulfonylphenyl-azo-phenyl dyes and a process for their synthesis. 4,046,757, Cl. 260-207.000.
Meyer, Charles A., to Westinghouse Electric Corporation. Seal arrangement utilizing deflector seals of reduced radial dimension. 4,046,388, Cl. 277-53.000.
Meyer, John E.: *See*—
Hutchines, Jimmy L.; and Meyer, John E., 4,047,091, Cl. 321-15.000.
Meyer, Ronald E.: *See*—
Benasutti, Louis D.; Neubauer, Jerry L.; and Meyer, Ronald E., 4,046,438, Cl. 312-138.00A.
Meyer, Rudolf, to Siemens Aktiengesellschaft. Irradiation installation for ionizing radiation. 4,047,043, Cl. 250-401.000.
Michalski, Dieter: *See*—
Schadow, Rudolf; and Michalski, Dieter, 4,046,982, Cl. 200-159.00R.
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Beggs, Donald, 4,046,557, Cl. 75-35.000.
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Warnke, Heinrich; and Kaup, Friedel, 4,046,646, Cl. 204-38.00B.
Mihara, Yuji: *See*—
Hinata, Masanao; Mihara, Yuji; Sato, Akira; and Ikeda, Tadashi, 4,046,572, Cl. 96-69.000.
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Matsuyama, Shigeru; and Mikami, Hiroshi, 4,046,187, Cl. 164-53.000.
Miki, Tetsuya: *See*—
Toda, Koichi; Miki, Tetsuya; and Yamaguchi, Haruo, 4,047,115, Cl. 328-151.000.
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Burton, Vance P.; and Mikulicz, Michael Z., 4,046,516, Cl. 23-288.00E.
Milberger, Walter E.; and Klein, Gerald I., to Westinghouse Electric Corporation. Circuit for setting magnetic remanence in a magnetizable core. 4,047,046, Cl. 307-101.000.
Miles Laboratories, Inc.: *See*—
Johnson, Leighton Clifford, 4,046,513, Cl. 23-253.0TP.
Johnston, Katharine Gentry; and Smith, Melvin Dee, 4,046,514, Cl. 23-253.0TP.
Miles Mumford Limited: *See*—
Mumford, Michael Anthony, 4,045,907, Cl. 46-93.000.
Miles, Peter: *See*—
Smith, Malcolm John; Miles, Peter; Richardson, Norman; and Finan, Michael Anthony, 4,046,707, Cl. 252-180.000.
Milewski, Andrzej, to International Business Machines Corporation. Method and apparatus for fast determination of initial transversal equalizer coefficient values. 4,047,013, Cl. 235-156.000.
Milito, Richard A.: *See*—
Das, Subodh K.; and Milito, Richard A., 4,046,558, Cl. 75-68.00A.
Millauer, Hans: *See*—
Pistorius, Rudolf; and Millauer, Hans, 4,046,652, Cl. 204-78.000.
Miller, Arthur O. Universal data recording system. 4,047,155, Cl. 340-147.00R.
Miller, Charles G.: *See*—
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Miller, Coleman J., to Westinghouse Electric Corporation. FM pulse compression radar. 4,047,173, Cl. 343-17.2PC.
Miller, G. Kirby; and Lawler, John F., to GTE Sylvania Incorporated. Electrostatically charged cable transducer. 4,047,166, Cl. 340-261.000.
Miller, Harry R.; and Borba, Paul A. Implements for such uses as animal grooming, fish scaling, and vegetable grating. 4,046,109, Cl. 119-92.000.
Miller, James W.; and Zarecky, Frederick D., to Libbey-Owens-Ford Company. Retractable support for float glass apparatus. 4,046,549, Cl. 65-182.00R.
Miller, Joe A.: *See*—
Winchell, David A.; Miller, Joe A.; and Martin, Jerry D., 4,046,276, Cl. 215-250.000.
Miller, Keith G. Lighting fixture accessory. 4,046,448, Cl. 339-153.000.
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Miller, Robert E., to Johns Hopkins University, The. Monotrack radar recording/playback system. 4,047,170, Cl. 343-5.0PC.
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Klein, Norman E., 4,045,990, Cl. 72-190.000.
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Lee, Timothy Charles Philip; and Millns, William, 4,046,834, Cl. 260-752.000.
Mills, John W. Valve for soft ice cream machine. 4,045,976, Cl. 62-308.000.
Milne, John D., to MM Plastic (Mfg) Company, Inc. Closure plugs. 4,046,168, Cl. 138-89.000.
Minami, Hidehiro: *See*—
Nakagawa, Ryoichi; Nambu, Shuya; and Minami, Hidehiro, 4,046,122, Cl. 123-139.0AW.
Minneapolis Electric Steel Castings Company: *See*—
Larsen, Darrell R., 4,046,326, Cl. 241-182.000.
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Yamamoto, Shunji, 4,046,470, Cl. 355-13.000.
Mitchell, Howard Earl, to Dresser Industries, Inc. Locking apparatus for earth boring cutter or stabilizer. 4,046,206, Cl. 175-364.000.
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Mitchell, Robert Lee; and Chung, William John, to Colgate Palmolive Company. Dental cream. 4,046,872, Cl. 424-52.000.
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Kume, Tsutomu; Kasai, Kazuo; Kaneko, Hidefumi; Sugiyama, Shigeo; and Mithuhashi, Shigeo, 4,047,230, Cl. 360-17.000.
Mitsche, Roy T.; Kuntz, Hillard L.; and Hayes, John C., to UOP Inc. Method of manufacturing an extruded catalyst composition. 4,046,713, Cl. 252-455.00Z.
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Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Hashimoto, Shinichiro; Goto, Toru; and Kajino, Yukio, 4,046,987, Cl. 219-135.000.
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Takemoto, Takashi, 4,046,126, Cl. 123-148.0DS.
Yoshida, Hiroshi, 4,046,403, Cl. 280-701.000.
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Iijima, Katsuhiko; and Yoshida, Katsuhiko, 4,046,346, Cl. 248-298.000.
Imamura, Yoshiaki, 4,046,057, Cl. 90-14.000.
Mitsui Mining & Smelting Co., Ltd.: *See*—
Saitoh, Kozo; Tanaka, Hiroshi; Nagahama, Tatsuya; and Izumi, Sumio, 4,046,677, Cl. 209-166.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, 4,046,785, Cl. 260-380.000.
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Miura, Yasunobu: *See*—
Kawamura, Yuichi; Hirano, Goro; Nagai, Makoto; and Miura, Yasunobu, 4,046,582, Cl. 106-88.000.
Miyake, Katsuya, to Akebono Brake Industry Co., Ltd. Antiskid device. 4,046,426, Cl. 303-100.000.
Miyata, Katsuharu: *See*—
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, 4,046,785, Cl. 260-380.000.
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Kitagami, Kazuo; Miyata, Katsuhiko; and Arai, Akihiro, 4,047,206, Cl. 354-152.000.
Miyazaki, Joichi, to Kabushiki Kaisha Daini Seikosha. Circuit board for an electronic timepiece. 4,045,953, Cl. 58-23.00R.
Mizuno, Masayoshi; Kawamoto, Tadashi; and Iida, Kiichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Relief printing plate having projections in non-image areas. 4,046,071, Cl. 101-395.000.
Mizuta, Atsuo: *See*—
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.
MM Plastic (Mfg) Company, Inc.: *See*—
Milne, John D., 4,046,168, Cl. 138-89.000.
Mobil Oil Corporation: *See*—
Chen, Nai Yuen; and Heinemann, Heinz, 4,046,522, Cl. 48-102.00A.
Cloud, Wayne B., 4,046,194, Cl. 166-248.000.
Farcasiu, Malvina; and Whitehurst, Darrell Duayne, 4,046,668, Cl. 208-11.0LE.
Glenn, Edwin E., Jr., 4,046,220, Cl. 181-105.000.
Ireland, Henry R.; and Stein, Thomas R., 4,046,829, Cl. 260-676.00R.
Kuo, James C., 4,046,830, Cl. 260-676.00R.
Kuo, James C., 4,046,831, Cl. 260-676.00R.
Napier, Roger P., 4,046,774, Cl. 260-315.000.
Owen, Hartley; and Venuto, Paul B., 4,046,825, Cl. 260-668.00R.
Owen, Hartley; Venuto, Paul B.; and Habib, Edward T., Jr., 4,046,827, Cl. 260-672.00T.
Peiser, Alfred M., 4,047,004, Cl. 235-151.120.
Piotrowski, Alfred B., 4,046,519, Cl. 44-51.000.
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,046,859, Cl. 423-328.000.
Moertel, George B., to Textron, Inc. Folded tape slide fastener stringer with external cord. 4,045,846, Cl. 24-205.16C.
Moggi, Pietro Antonio; and Romano, Ugo, to SNAM Progetti S.p.A. Process for the preparation of diphenylamine and derivatives thereof. 4,046,810, Cl. 260-571.000.
Mohr, Reinhard: *See*—
Hohmann, Kurt; Mohr, Reinhard; and Hahnke, Manfred, 4,046,752, Cl. 260-158.000.
Mohrbacher, Richard J.: *See*—
Schwartz, Norman; and Mohrbacher, Richard J., 4,046,763, Cl. 260-250.00B.
Moline, Roy V., to Jeno's, Inc. Method for forming dough shells. 4,046,920, Cl. 426-19.000.
Moller, Erwin; Bausch, Franz Hubert; and Frolich, Martin, to Hamba-Maschinenfabrik Hans A. Muller, Firma. Apparatus for the sterile filling of foods into containers. 4,045,945, Cl. 53-167.000.
Molloy, Denis Edward: *See*—
Gardner, Charles Stanley; and Molloy, Denis Edward, 4,046,662, Cl. 204-275.000.
Molloy, Richard P., to Interkal, Inc. Alignment device for telescoping gymnasium seating. 4,045,921, Cl. 52-9.000.
Monsanto Company: *See*—
Burnett, Joseph C., Jr.; Hicks, John J.; and Hovey, Leonard L., 4,046,651, Cl. 204-73.00R.
Carr, David M.; and Chandler, Thomas O., 4,045,858, Cl. 29-427.000.
Harris, Alva F., 4,046,735, Cl. 260-45.8NT.
Mortimer, George A.; Pelezo, Chris A.; and Richardson, John C., 4,046,731, Cl. 260-30.60R.
Montagno, William J.; and MacIntyre, Allan L., to General Signal

Corporation. Hydraulic apparatus for raising and lowering an impeller shaft. 4,046,352, Cl. 254-29.00R.

Montgomery, Warren G. Continuous mining machine with hinged cutter guide extensions. 4,046,424, Cl. 299-56.000.

Moore, John Howard, to Lucas Electrical Company Limited, The. Internal combustion engine fuel injection control system. 4,046,113, Cl. 123-32.0EA.

Moore, Roger E.: *See—*
Kalina, Theodore; and Moore, Roger E., 4,046,523, Cl. 48-197.00R.

Moran, Patrick J.: *See—*
Wilson, Charles A.; and Moran, Patrick J., 4,046,993, Cl. 235-61.50D.

Moraw, Roland, to Hoechst Aktiengesellschaft. Apparatus and process for electrostatically charging a recording material. 4,047,238, Cl. 361-229.000.

Moreman, Otis S., III, to United States of America, National Aeronautics and Space Administration. Deformable bearing seat. 4,046,434, Cl. 308-195.000.

Moreman, Otis S., III, to United States of America, National Aeronautics and Space Administration. Bearing seat usable in a gas turbine engine. 4,046,435, Cl. 308-195.000.

Mori, Hidetoshi: *See—*
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, 4,046,785, Cl. 260-380.000.

Morimoto, Kiyoshi: *See—*
Kishino, Takao; Morimoto, Kiyoshi; and Utamura, Yukihiko, 4,047,072, Cl. 313-496.000.

Morin, Raymond O. Electrical instrument holder. 4,046,294, Cl. 224-5.00H.

Moringiello, Donald C.: *See—*
Buono, Dennis F.; Carlson, Nils G.; Hibner, David H.; and Moringiello, Donald C., 4,046,430, Cl. 308-26.000.

Morino, Seiji: *See—*
Katsuoka, Ritsu; Kawai, Hisasi; and Morino, Seiji, 4,046,999, Cl. 235-150.530.

Moritani, Masahiko: *See—*
Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, 4,046,850, Cl. 264-216.000.

Moritomo, Sadao, to Seiko Seiki Kabushiki Kaisha. High speed grinding spindle. 4,045,919, Cl. 51-165.770.

Morokuma, Tadashi; and Tsuda, Naotsune, to Olympus Optical Co. Ltd. Method of manufacturing magnetic heads. 4,045,864, Cl. 29-603.000.

Moroz, Leonard Arthur, to Canadian Patents and Development Limited. Method for detecting enzymes capable of digesting fibrinogen or fibrin. 4,046,635, Cl. 195-103.700.

Morozumi, Hiroshi: *See—*
Ohmura, Yoshito; Okabe, Takahiro; and Morozumi, Hiroshi, 4,047,119, Cl. 330-30.00D.

Morris, Earl L.; and Fields, Larry D., to Acorn Engineering Company. Combination lavatory and toilet assembly. 4,045,827, Cl. 4-3.000.

Morris, Frank E., to Kaiser Aluminum & Chemical Corporation. Metal cased refractory and method of making same. 4,045,935, Cl. 52-599.000.

Morrison, Hadley F., to McDonnell Douglas Corporation. Flexible bottom containers. 4,046,277, Cl. 220-1.500.

Morrison, Steven; and Williams, George A., to Westinghouse Electric Corporation. Coordinate converter. 4,047,014, Cl. 235-189.000.

Morse, Philip W.: *See—*
Klingenberg, James C.; Patel, Hiralal V.; and Morse, Philip W., 4,046,315, Cl. 233-4.000.

Morse, Robert L., to Mechanisms, Inc. Impact energy absorption device. 4,046,361, Cl. 267-139.000.

Mortimer, George A.; Pelezo, Chris A.; and Richardson, John C., to Monsanto Company. Process for preparing dopes from which shaped articles of oxadiazole/N-alkylhydrazide copolymers are obtained. 4,046,731, Cl. 260-30.60R.

Morton-Norwich Products, Inc.: *See—*
Yu, Chia-Nien, 4,046,781, Cl. 260-347.700.

Mory, Rudolf; and Muller, Rolf, to Ciba-Geigy Corporation. Disazo pigments containing naphthalene coupling components. 4,046,755, Cl. 260-174.000.

Morz, Gunter, to Licentia Patent-Verwaltungs-G.m.b.H. System filter for double frequency utilization. 4,047,128, Cl. 333-11.000.

Moser, Helmut; and von Tobel, Hans, to Sandoz Ltd. Basic disazo dyes having two 2-hydroxy-3-substituted carbamoylnaphthyl-1-azophenyl groups for dyeing paper. 4,046,502, Cl. 8-7.000.

Moser, Paul: *See—*
Rasberger, Michael; Rody, Jean; Moser, Paul; and Muller, Helmut, 4,046,788, Cl. 260-404.000.

Moskovich, Jacob; Wiese, Gary E.; Altman, Richard M.; and McLaughlin, Thomas D., to Optigon Research & Development Corporation. Camera viewfinding system. 4,047,222, Cl. 354-155.000.

Moss, John H. Hydroponic nutrient feeding and draining system. 4,045,909, Cl. 47-1.200.

Moss, Ronald W.: *See—*
McClanahan, Edwin D.; and Moss, Ronald W., 4,046,666, Cl. 204-298.000.

Motorola, Inc.: *See—*
Clark, Lowell E.; Roop, Raymond M.; and Volk, Charles E., 4,047,218, Cl. 357-34.000.
Eichler, Jay H., 4,046,295, Cl. 224-5.00H.
Fugit, Brian Blair, 4,047,171, Cl. 343-6.80R.
Goodner, Willis Ray; Smith, James Nelson; and Horvath, John, 4,046,820, Cl. 260-652.50R.
Schafft, Hugo Willy, 4,047,060, Cl. 310-322.000.

Motz, Herbert: *See—*
Hartmann, Hans-Joerg; Falk, Roland; Gawlik, Peter; Balz, Werner; Uhl, Karl; Schaefer, Dieter; and Motz, Herbert, 4,046,932, Cl. 428-64.000.

Moulton Developments Limited: *See—*
Best, Anthony; and Harman, Harold, 4,046,360, Cl. 267-65.00B.

Mouwen, Herman Charles, to Johnson & Johnson; and Purolator, Inc. Extracorporeal circuit blood filter. 4,046,696, Cl. 210-431.000.

Muecke, Thomas W.: *See—*
Gruesbeck, Clay; Salathiel, William M.; Muecke, Thomas W.; and Cooke, Claude E., Jr., 4,046,198, Cl. 166-278.000.
Gruesbeck, Clay, Jr.; Penberthy, Walter L., Jr.; and Muecke, Thomas W., 4,046,197, Cl. 166-305.00R.

Mueller, Curt: *See—*
Maderni, Piero; and Mueller, Curt, 4,046,756, Cl. 260-205.000.
Meybeck, Jacques; Mueller, Curt; and Mueller, Fred, 4,046,757, Cl. 260-207.000.

Mueller, Dale R., to Owens-Corning Fiberglas Corporation. Strand collecting apparatus and method. 4,046,330, Cl. 242-18.00G.

Mueller, Fred: *See—*
Meybeck, Jacques; Mueller, Curt; and Mueller, Fred, 4,046,757, Cl. 260-207.000.

Mueller, Karl Friedrich; and Falk, Robert A., to Ciba-Geigy Corporation. Fluorinated condensation polymers and their use as soil release agents. 4,046,944, Cl. 428-262.000.

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Muller, Albrecht, to Ciba-Geigy Corporation. Fluorine substituted maleimides. 4,046,777, Cl. 260-326.260.

Muller, Hans; and Grob, Louis, to Chemap AG. Process for the separation of waste products of the food industry. 4,046,789, Cl. 260-412.800.

Muller, Helmut: *See—*
Rasberger, Michael; Rody, Jean; Moser, Paul; and Muller, Helmut, 4,046,788, Cl. 260-404.000.

Muller, Rolf, to Mead Corporation, The. Apparatus for forming a wrapper about a group of articles. 4,045,942, Cl. 53-48.000.

Muller, Rolf: *See—*
Mory, Rudolf; and Muller, Rolf, 4,046,755, Cl. 260-174.000.

Muller, Werner Heinrich, to Hoechst Aktiengesellschaft. Process for preparing resorcinol monoethers. 4,046,816, Cl. 260-613.00R.

Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., to Excel Industries, Inc. Lawn edger attachment. 4,046,200, Cl. 172-14.000.

Mumford, Michael Anthony, to Miles Mumford Limited. Floatable toys. 4,045,907, Cl. 46-93.000.

Munson, Lowell W.: *See—*
Coope, Robert L.; and Munson, Lowell W., 4,046,364, Cl. 269-244.000.

Murakami, Katsuyuki: *See—*
Itai, Reiichi; and Murakami, Katsuyuki, 4,046,655, Cl. 204-149.000.

Murata Manufacturing Co., Ltd.: *See—*
Ishiyama, Hideki, 4,047,129, Cl. 333-72.000.

Murdoch, Robert N.; Travaglio, Vincent M.; and Magnifico, Michael L., to Emhart Corporation. Merchandise display shelving assembly. 4,046,083, Cl. 108-107.000.

Murphy, Bartholomew D.; and Gonyea, David C., to General Electric Company. Method and apparatus for determining rotor life expended. 4,046,002, Cl. 73-116.000.

Murray, David P. Sock lock device. 4,045,844, Cl. 24-81.0DM.

Murray, Reginald: *See—*
Brown, Dennis Cockburn; and Murray, Reginald, 4,046,305, Cl. 228-194.000.

Musgrave, Daniel Dennis. Apparatus for making barbed material. 4,045,985, Cl. 72-56.000.

Musick, Charles Ronald; and Torres, Jose Marcelo, to Combustion Engineering, Inc. Automatic motion inhibit system for a nuclear power generating system. 4,046,625, Cl. 176-24.000.

Muzyczko, Thaddeus M.; and Jones, Thomas H., to Richardson Company, The. Photoreactive compositions comprising polymers containing alkoxyaromatic glyoxy groups. 4,046,577, Cl. 96-115.00R.

Myers, David C., to Lawrence Peska Associates, Inc., a part interest. Adjustable auto thermostat. 4,046,319, Cl. 236-34.500.

N L Industries, Inc.: *See—*
Stridde, George E., 4,046,826, Cl. 260-671.00C.

Naegeli, Peter, to Givaudan Corporation. Novel odorant compositions. 4,046,716, Cl. 252-522.000.

Nagahama, Tatsuya: *See—*
Saitoh, Kozo; Tanaka, Hiroshi; Nagahama, Tatsuya; and Izumi, Sumio, 4,046,677, Cl. 209-166.000.

Nagai, Makoto: *See—*
Kawamura, Yuichi; Hirano, Goro; Nagai, Makoto; and Miura, Yasunobu, 4,046,582, Cl. 106-88.000.

Nagano, Tetsuro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Combustion chamber of internal combustion engine. 4,046,111, Cl. 123-32.0SP.

Nagel, Robert I., to Dominion Auto Accessories Limited. Combined clearance and marker lamp. 4,047,019, Cl. 240-8.200.

Najarian, George. Target practice attachment for a firearm. 4,046,130, Cl. 124-28.000.

Nakagawa, Kazuyoshi, to Honeywell Inc. Voltage-frequency converter. 4,047,056, Cl. 307-271.000.

Nakagawa, Ryoichi; Nambu, Shuya; and Minami, Hidehiro, to Nissan

Motor Co., Ltd. Fuel feed control system of internal combustion engine. 4,046,122, Cl. 123-139.0AW.
Nakagome, Takenari: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.
Nakahara, Roy Hiroshi: *See*—
Erickson, Fred William; and Nakahara, Roy Hiroshi, 4,047,049, Cl. 307-157.000.
Nakai, Setsuo: *See*—
Tada, Sugihiko; Nakai, Setsuo; Irie, Kazuo; Saito, Hirokazu; and Suzuki, Hideaki, 4,046,154, Cl. 134-65.000.
Nakakita, Sigeru: *See*—
Izumo, Masanori; and Nakakita, Sigeru, 4,046,530, Cl. 55-181.000.
Nakamura, Kotaro: *See*—
Inouye, Kozo; Nakamura, Kotaro; Yokota, Yukio; Nakazyo, Kiyoshi; and Okumura, Akio, 4,046,573, Cl. 96-74.000.
Nakamura, Mitsuko: *See*—
Maeshima, Tsugio; Nishikawa, Eiichiroh; and Nakamura, Mitsuko, 4,046,888, Cl. 423-239.000.
Nakamura, Shigeru: *See*—
Nakanishi, Yoshiyuki; Nakamura, Shigeru; and Ono, Tetsuji, 4,046,780, Cl. 260-346.400.
Nakamura, Yuji: *See*—
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,046,670, Cl. 208-48.0AA.
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, to Canon Kabushiki Kaisha. Camera system with means for automatically switching to flash operation. 4,047,194, Cl. 354-149.000.
Nakanishi, Yoshiyuki; Nakamura, Shigeru; and Ono, Tetsuji, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Preparation of phthalic anhydride. 4,046,780, Cl. 260-346.400.
Nakazyo, Kiyoshi: *See*—
Inouye, Kozo; Nakamura, Kotaro; Yokota, Yukio; Nakazyo, Kiyoshi; and Okumura, Akio, 4,046,573, Cl. 96-74.000.
Nambu, Shuya: *See*—
Nakagawa, Ryoichi; Nambu, Shuya; and Minami, Hidehiro, 4,046,122, Cl. 123-139.0AW.
Napier, Roger P., to Mobil Oil Corporation. Process for N-phosphorylation of heterocyclic amines. 4,046,774, Cl. 260-315.000.
Naret, Avgustina Alexandrovna, administrator: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.
Naret, Grigory Borisovich, deceased: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.
Naruse, Seiji: *See*—
Maeda, Fumiaki; Naruse, Seiji; and Kamiya, Ko, 4,046,001, Cl. 73-100.000.
National Casein of New Jersey: *See*—
Bye, Carolyn N., 4,046,955, Cl. 428-479.000.
National Semiconductor Corporation: *See*—
Hutchines, Jimmy L.; and Meyer, John E., 4,047,091, Cl. 321-15.000.
Nelson, Carl T.; and Hollins, Brian E., 4,046,605, Cl. 148-175.000.
National Service Industries, Inc.: *See*—
Grimes, Charles, 4,046,358, Cl. 259-147.000.
Natural Science Industries, Ltd.: *See*—
Freedman, Robert Nathan, 4,045,918, Cl. 51-164.000.
Navi, Menashe, to ANPA Research Institute. Method and apparatus for inserting a bundle of newspaper inserts into a hopper. 4,046,370, Cl. 271-3.100.
Navi, Menashe: *See*—
Merker, George; Navi, Menashe; and Krupp, Joseph, 4,046,367, Cl. 270-55.000.
Nazarenko, Nicholas, to Du Pont de Nemours, E. I., and Company. Process for the preparation of triarylborane. 4,046,815, Cl. 260-606.50B.
Nazaretian, Eduard Gurgenovich: *See*—
Kholmogorov, Mikhail Vladimirovich; Katkov, Jury Vasilievich; Vorbiev, Grigory Vasilievich; Gusev, Alexandr Mikhailovich; and Nazaretian, Eduard Gurgenovich, 4,045,991, Cl. 72-251.000.
Neath, Robert Arthur, to Exxon Production Research Company. Subsea hydraulic choke. 4,046,191, Cl. 166-.500.
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, to Roussel-UCLAF. Phenylpiperidines. 4,046,901, Cl. 424-267.000.
Negrevergne, Georges, to Societe Anonyme Cortial S.A. N-(carboxymethoxy-benzylidine)carboxy anilines and pharmaceutical compositions thereof. 4,046,916, Cl. 424-319.000.
Nehezvegyipari Kutato Intezet: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.
Nelson, Carl T.; and Hollins, Brian E., to National Semiconductor Corporation. Method of electrically isolating individual semiconductor circuits in a wafer. 4,046,605, Cl. 148-175.000.
Nelson, John E., to HMW Industries, Inc. Palatal expander. 4,045,871, Cl. 32-14.00E.
Nelson, Lloyd A.: *See*—
Sekhon, Kalwant S.; Nelson, Lloyd A.; and Fritz, John E., Jr., 4,047,198, Cl. 357-82.000.
Nelson, Lorne W.; and Sutton, David J., to Honeywell Inc. Refrigeration load shedding control device. 4,046,531, Cl. 62-202.000.
Nelson, Lorne W., to Honeywell Inc. Refrigeration load shedding control device. 4,046,532, Cl. 62-215.000.
Nelson, Richard Stuart: *See*—
Cairns, James Anthony; Nelson, Richard Stuart; and Barnfield, Rhydwyn William, 4,046,712, Cl. 252-447.000.
Nelson, Robert K., to Eaton Corporation. Multiple drive axle assembly. 4,046,210, Cl. 180-24.100.
Nemessanyi nee Szekely, Zsuzsanna: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.
Neoloy Products, Inc.: *See*—
Prosen, Emil M., 4,046,561, Cl. 75-172.00R.
Neubauer, Jerry L.: *See*—
Benasutti, Louis D.; Neubauer, Jerry L.; and Meyer, Ronald E., 4,046,438, Cl. 312-138.00A.
Neujens, Georges Jozef: *See*—
Stievenart, Emile Frans; Plessers, Hendrik Sylvester; Neujens, Georges Jozef; and Van Bouwel, Leo Pa ul, 4,047,193, Cl. 354-105.000.
Newco Fireplace Equipment Limited, Inc.: *See*—
White, Charles R., 4,046,132, Cl. 126-9.00R.
Newlin, Larry L.: *See*—
Chapman, William L.; and Newlin, Larry L., 4,047,090, Cl. 363-34.000.
Newman, Christopher J.: *See*—
McKerrow, George C.; Pelletier, Albert; and Newman, Christopher J., 4,046,323, Cl. 241-23.000.
Newman, Ritchey O., Jr., to Dow Chemical Company, The. Cutting apparatus. 4,046,497, Cl. 425-313.000.
Nichols Engineering & Research Corporation: *See*—
Barry, Louis T.; and Czop, Gordon W., 4,046,085, Cl. 110-12.000.
von Dreusche, Charles F., Jr., 4,046,086, Cl. 110-12.000.
Nichols, Sterling M.: *See*—
Paton, George A.; Nichols, Sterling M.; and Sanders, John H., 4,045,949, Cl. 57-140.0BY.
Nickerson, Harvey R.: *See*—
Press, Irving D.; Rink, Helm A.; and Nickerson, Harvey R., 4,046,406, Cl. 285-47.000.
Nielsen, Edwin A.: *See*—
Ensmann, Burt; Nielsen, Edwin A.; Snyder, Edward, III; and Ventura, Frank D., 4,045,908, Cl. 46-204.000.
Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.): *See*—
Satto, Seiichi, 4,047,136, Cl. 335-222.000.
Nilsson, Goran: *See*—
Brannstrom, Roine; and Nilsson, Goran, 4,045,955, Cl. 60-39.28R.
Nippon Electric Co., Ltd.: *See*—
Inoue, Yasukazu; and Fujimoto, Shoji, 4,046,607, Cl. 148-187.000.
Nippon Electric Kagoshima, Limited: *See*—
Kobayakawa, Masaki; and Akahane, Fumitake, 4,047,066, Cl. 313-217.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Ogita, Minoru, 4,047,116, Cl. 329-124.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Yamagishi, Hidehisa; and Tanaka, Mizuo, 4,046,604, Cl. 148-156.000.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Nakanishi, Yoshiyuki; Nakamura, Shigeru; and Ono, Tetsuji, 4,046,780, Cl. 260-346.400.
Nippon Soken, Inc.: *See*—
Akita, Sigeyuki; and Kitagawa, Junji, 4,047,149, Cl. 340-52.00B.
Katsuoka, Ritsu; Kawai, Hisasi; and Morino, Seiji, 4,046,999, Cl. 235-150.530.
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,046,998, Cl. 235-150.210.
Nippon Steel Corporation: *See*—
Takechi, Hiroshi; Abe, Mitsunobu; Usuda, Matsuo; and Komiya, Kunihiko, 4,046,597, Cl. 148-12.00R.
Nippon Telegraph and Telephone Public Corporation: *See*—
Toda, Koichi; Miki, Tetsuya; and Yamaguchi, Haruo, 4,047,115, Cl. 328-151.000.
Yasuda, Hiroshi; and Kanaya, Fumio, 4,047,221, Cl. 358-136.000.
Nippon Zoki Pharmaceutical Co., Ltd.: *See*—
Takino, Masuichi; Kurosaki, Teikichi; and Odaka, Munehiko, 4,046,893, Cl. 424-251.000.
Nishida, Katsutoshi: *See*—
Ishii, Takashi; Nishida, Katsutoshi; Komatsu, Michiyasu; and Tsuge, Akihiko, 4,046,580, Cl. 106-55.000.

Nishikawa, Eiichiroh: *See*—
Maeshima, Tsugio; Nishikawa, Eiichiroh; and Nakamura, Mitsuko, 4,046,888, Cl. 423-239.000.

Nishino, Atsushi: *See*—
Yoshida, Akihiko; and Nishino, Atsushi, 4,046,645, Cl. 204-37.00R.

Nissan Motor Co., Ltd.: *See*—
Aono, Shigeo, 4,046,118, Cl. 123-119.0EC.
Nakagawa, Ryoichi; Nambu, Shuya; and Minami, Hidehiro, 4,046,122, Cl. 123-139.0AW.
Suzuki, Kunihiko, 4,046,030, Cl. 74-710.000.

Nitto Chemical Industry Co., Ltd.: *See*—
Kawamura, Yuichi; Hirano, Goro; Nagai, Makoto; and Miura, Yasunobu, 4,046,582, Cl. 106-88.000.

Noguchi, Hiroshi: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

Nolan, James J.: *See*—
Markowski, Stanley J.; and Nolan, James J., 4,045,956, Cl. 60-39.650.

Nolan, John J.: *See*—
Marston, Peter G.; and Nolan, John J., 4,046,681, Cl. 209-224.000.

Nolde, George V.: *See*—
Ress, Thomas I.; and Nolde, George V., 4,047,068, Cl. 313-359.000.

Noranda Mines Limited: *See*—
McKerrow, George C.; Pelletier, Albert; and Newman, Christopher J., 4,046,323, Cl. 241-23.000.

Norddeutsche Affinerie: *See*—
Schulze, Reinhold, 4,046,687, Cl. 210-32.000.

Nordstrom, Arnold B., to Transequip Inc. Cargo container opening cover. 4,046,186, Cl. 160-368.00R.

Nordstrom, Donald B., to Solitron Devices, Inc. Torque limiting RF connector. 4,046,052, Cl. 85-61.000.

Noren, Don W., to Noren Products, Inc. Disguised emergency light. 4,047,020, Cl. 240-46.590.

Noren Products, Inc.: *See*—
Noren, Don W., 4,047,020, Cl. 240-46.590.

Norlin Music, Inc.: *See*—
Luce, David A.; and Marchese, Anthony, 4,046,049, Cl. 84-1.110.

Norris, Lee E.: *See*—
Buffington, James F.; and Norris, Lee E., 4,045,882, Cl. 34-171.000.

North American Philips Corporation: *See*—
Conklin, Thomas, 4,047,070, Cl. 313-388.000.

Notter, Eugen: *See*—
Eggenmuller, Alfred; Bellan, Heinrich; Scherer, Lorenz; Notter, Eugen; and Wagler, Werner, 4,046,068, Cl. 100-65.000.

Novak, Thomas A., to Eaton Corporation. Relief valve. 4,046,163, Cl. 137-512.300.

Nowak, Edward N.; and Frech, Kenneth J., to Goodyear Tire & Rubber Company, The. Catalytic process for the preparation of butenes from propylene. 4,046,832, Cl. 260-683.00D.

Nowell, John Rawson, to Honeywell Information Systems Inc. Switching regulator control circuit. 4,045,887, Cl. 361-98.000.

Nuclear Power Company (Whetstone) Limited: *See*—
Middleton, John Ernest, 4,046,628, Cl. 176-38.000.

Nulcear Power Company (Whetstone) Limited: *See*—
Middleton, John Ernest, 4,046,627, Cl. 176-38.000.

Nuova San Giorgio S.p.A.: *See*—
Piro, Mario, 4,046,102, Cl. 118-78.000.

Nutting Truck and Caster Company: *See*—
Restad, Everett L.; and Pitan, Roger W., 4,046,391, Cl. 280-5.240.

N.V. Optische Industrie "De Oude Delft": *See*—
Groeneweg, Abraham, 4,047,209, Cl. 354-212.000.

Oberholtzer, Earl R.: *See*—
Cohen, Edward M.; and Oberholtzer, Earl R., 4,046,804, Cl. 260-501.210.

Ocker, Klaus Frederick: *See*—
Wheeler, Walter Morris; and Ocker, Klaus Frederick, 4,046,332, Cl. 242-107.40A.

Oda, Shinichi: *See*—
Saito, Toranosuke; Kohno, Jujiro; Tanaka, Daiichiro; and Oda, Shinichi, 4,046,941, Cl. 428-323.000.

Odaka, Munehiko: *See*—
Takino, Masuichi; Kurosaki, Teikichi; and Odaka, Munehiko, 4,046,893, Cl. 424-251.000.

Odenwalder, Heinrich; Ranz, Erwin; Puschel, Walter; and Vetter, Hans, to AGFA-Gevaert, Aktiengesellschaft. Color photographic material with homophthalimide thioether development inhibitor. 4,046,574, Cl. 96-99.000.

Odstrchel, Gerald: *See*—
Hertl, William; and Odstrchel, Gerald, 4,046,870, Cl. 424-1.000.

O'Farrell, James T.: *See*—
Wood, Kenneth E.; and O'Farrell, James T., 4,047,147, Cl. 340-3.00R.

Ogawa, Ichitaro: *See*—
Kobayashi, Kazuo; Ogawa, Ichitaro; Honda, Hidemasa; and Matsushita, Yasuhiro, 4,046,863, Cl. 423-448.000.

Ogita, Minoru, to Nippon Gakki Seizo Kabushiki Kaisha. FM multiplex stereo demodulating circuit. 4,047,116, Cl. 329-124.000.

Ohara, Katsunobu: *See*—
Ando, Yujiro; Ohara, Katsunobu; and Shinohara, Yukimasa, 4,046,466, Cl. 355-3.00R.

O'Hara, Mark J., to UOP Inc. Method of manufacturing a hydrorefining catalyst. 4,046,714, Cl. 252-455.00R.

Ohio State University, The: *See*—
Schlosser, Philip A.; and Steidley, John W., 4,047,037, Cl. 250-370.000.

Ohkubo, Kazuo: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.

Ohkubo, Yoshio; and Kobayashi, Yoshichika, to Matsushita Electronics Corporation. Method for forming semiconductor devices. 4,046,595, Cl. 148-1.500.

Ohmura, Ryuichi, to Fuji Kogyo Co., Ltd. Fastening device for a reel on fishing rods. 4,045,902, Cl. 43-22.000.

Ohmura, Yoshito; Okabe, Takahiro; and Morozumi, Hiroshi, to Hitachi, Ltd. Transistor differential amplifier circuit. 4,047,119, Cl. 330-30.00D.

Ohori, Harumi; and Shibatani, Juichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Disc brake. 4,046,231, Cl. 188-71.100.

Okabe, Takahiro: *See*—
Ohmura, Yoshito; Okabe, Takahiro; and Morozumi, Hiroshi, 4,047,119, Cl. 330-30.00D.

Okajima, Hidekazu: *See*—
Toyama, Masamichi; Takigawa, Tomoshi; Shimazaki, Mamoru; Okajima, Hidekazu; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,465, Cl. 352-175.000.

Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, to Mitsubishi Chemical Industries Limited. N^2-alkoxynaphthalenesulfonyl-L-argininamides and the pharmaceutically acceptable salts thereof. 4,046,876, Cl. 424-177.000.

Okamoto, Yasuo: *See*—
Hirasawa, Kazuhiko; and Okamoto, Yasuo, 4,046,650, Cl. 204-67.000.

Okamura, Kosaku: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

Oki Electric Industry Co., Ltd.: *See*—
Yagishita, Tohmi; and Hagiya, Hiroshi, 4,047,228, Cl. 358-261.000.

Okuda, Naoki; and Tanaka, Kazuo, to Kobe Steel Ltd. Method of preventing base metal end crack in arc welding and end tab used therefor. 4,046,988, Cl. 219-137.00R.

Okumura, Akio: *See*—
Inouye, Kozo; Nakamura, Kotaro; Yokota, Yukio; Nakazyo, Kiyoshi; and Okumura, Akio, 4,046,573, Cl. 96-74.000.

Olin Corporation: *See*—
Spangler, Perry Kay, 4,046,075, Cl. 102-37.800.

Olinkraft, Inc.: *See*—
Booth, Vernard S.; and Oswalt, Billy W., 4,046,307, Cl. 229-15.000.
Poggiali, Lewis D., 4,046,309, Cl. 229-23.00R.

Oliver, James W., Jr., to Dunham-Bush, Inc. Self operating excess refrigerant storage system for a heat pump. 4,045,977, Cl. 62-324.000.

Ollendick, Gary B., to Teletype Corporation. Method and apparatus for controlling a web handling device. 4,047,085, Cl. 318-601.000.

Olsen, Donald W. One-way valve for fluid sampler device. 4,046,011, Cl. 73-421.00B.

Olund, Sven A., to Chevron Research Company. Refrigeration working fluid containing branched chain alkylbenzene lubricant. 4,046,533, Cl. 62-468.000.

Olympus Optical Co., Ltd.: *See*—
Koizumi, Toshimichi, 4,046,460, Cl. 350-216.000.
Komiya, Osamu, 4,046,149, Cl. 128-328.000.
Morokuma, Tadashi; and Tsuda, Naotsune, 4,045,864, Cl. 29-603.000.
Sato, Masaaki, 4,046,973, Cl. 179-100.110.

Omelyan, Fedor Evstafievich: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.

OMNI Corporation: *See*—
Bruning, William E., 4,046,185, Cl. 160-368.00G.

Ondetti, Miguel Angel; and Cushman, David W., to E. R. Squibb & Sons, Inc. Azetidine-2-carboxylic acid derivatives. 4,046,889, Cl. 424-244.000.

O'Neal, Larry. Inflatable dock seal and mounting therefor. 4,045,925, Cl. 52-2.000.

O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Line circuit using miniature line transformer. 4,046,967, Cl. 179-18.0FA.

O'Neill, John Francis: *See*—
Embree, Milton Luther; Goldthorp, David Clayton; and O'Neill, John Francis, 4,046,968, Cl. 179-18.0FA.

Ono, Tetsuji: *See*—
Nakanishi, Yoshiyuki; Nakamura, Shigeru; and Ono, Tetsuji, 4,046,780, Cl. 260-346.400.

Ontario Paper Company Limited, The: *See*—
Sexton, Ernest Arthur, 4,046,621, Cl. 162-40.000.

Optigon Research & Development Corporation: *See*—
Altman, Richard M.; and McLaughlin, Thomas D., 4,047,207, Cl. 354-155.000.

Moskovich, Jacob; Wiese, Gary E.; Altman, Richard M.; and McLaughlin, Thomas D., 4,047,222, Cl. 354-155.000.
Ordonez, Marino Paneda. Lifting members for truck bodies and similar units. 4,046,423, Cl. 298-22.00D.
Oronzio de Nora Impianti Elettrochimici S.p.A.: *See*—
de Nora, Oronzio; de Nora, Vittorio; and Spaziante, Placido M., 4,046,653, Cl. 204-95.000.
Ortho Diagnostics Inc.: *See*—
Reckel, Rudolph P., 4,046,871, Cl. 424-11.000.
Ortho Pharmaceutical Corporation: *See*—
Kanojia, Ramesh Maganlal, 4,046,882, Cl. 424-195.000.
Osawa, Tagui: *See*—
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, 4,046,785, Cl. 260-380.000.
Osberger, Helmut. Helicopters safety drive. 4,046,335, Cl. 244-17.190.
Osborne, Thomas E.: *See*—
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; Baum, Allen J.; Cochran, David S.; and Tung, Chung C., 4,047,012, Cl. 235-156.000.
Oswalt, Billy W.: *See*—
Booth, Vernard S.; and Oswalt, Billy W., 4,046,307, Cl. 229-15.000.
Otomo, Tetuo: *See*—
Fukuda, Teruo; and Otomo, Tetuo, 4,047,139, Cl. 336-150.000.
Ott, Anton; Ehrlinger, Friedrich; Knodler, Dietrich; and Zdansevicius, Roland, to Zahnradfabrik Friedrichshafen AG. Planetary-gear transmission. 4,046,031, Cl. 74-764.000.
Otten, Joachim; and Troster, Helmut, to Hoechst Aktiengesellschaft. Process for the dyeing and printing of synthetic polyamides. 4,046,501, Cl. 8-1.00E.
Overbury, Francis G., to International Standard Electric Corporation. Doppler scanning guidance system receiver. 4,047,177, Cl. 343-113.0DE.
Owen, Hartley; and Venuto, Paul B., to Mobil Oil Corporation. Conversion of oxygenated compounds to gasoline. 4,046,825, Cl. 260-668.00R.
Owen, Hartley; Venuto, Paul B.; and Habib, Edward T., Jr., to Mobil Oil Corporation. High selectivity transalkylation. 4,046,827, Cl. 260-672.00T.
Owens-Corning Fiberglas Corporation: *See*—
Eisenberg, Arnold J.; and Klink, Jerome P., 4,046,329, Cl. 242-18.00G.
Mueller, Dale R., 4,046,330, Cl. 242-18.00G.
Pitt, Richard E., 4,046,539, Cl. 65-6.000.
Stalego, Charles J., 4,046,535, Cl. 65-1.000.
Thomas, David Whitfield, 4,046,538, Cl. 65-4.00A.
Yakuboff, Paul D., 4,046,103, Cl. 118-125.000.
Owens-Illinois, Inc.: *See*—
Damm, David A., 4,046,258, Cl. 209-111.500.
Ernsthausen, Roger E., 4,047,065, Cl. 313-201.000.
Oxenberg, Bruce. Athletic shoe. 4,045,888, Cl. 36-114.000.
Oyler, Harry S. Low voltage protection circuit. 4,047,234, Cl. 361-92.000.
Ozaki, Nobuo, to Maeda Industries, Ltd. Bicycle speed change lever device. 4,046,025, Cl. 74-501.00R.
P. R. Mallory & Co., Inc.: *See*—
Evans, William J., 4,045,862, Cl. 29-570.000.
Kilmer, Bill G.; and Baugh, David F., Jr., 4,047,061, Cl. 310-164.000.
Paasch, Harold R. Protective cover for sewer grates. 4,046,482, Cl. 404-4.000.
Padrutt, Paul W.: *See*—
Baron, George B.; and Padrutt, Paul W., 4,046,270, Cl. 214-138.00R.
Paget, Charles J.; and Wikel, James H., to Eli Lilly and Company. N-(6-acyloxybenzothiazol-2-yl)-N'-phenyl (or substituted phenyl-)ureas. 4,046,770, Cl. 260-305.000.
Paggen, William D.: *See*—
Price, Jerome J.; Karsten, Carl G.; and Paggen, William D., 4,046,976, Cl. 200-61.930.
Paita, Orazio: *See*—
Giuliao, Ercole; Paita, Orazio; and Stringa, Luigi, 4,047,152, Cl. 340-146.3AG.
Pak, Vladimir Grigorievich: *See*—
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.
Paley, Hyman W. Removable locking connector for Luer fittings. 4,046,479, Cl. 403-306.000.
Palka, James J., to General Bathroom Products Corporation. Bathroom cabinet lighting fixture. 4,047,016, Cl. 240-4.000.
Palmer, Alexander Allan, to Sydney Hospital. Rotational viscometers. 4,045,999, Cl. 73-59.000.
Pampus, Gottfried: *See*—
Lehnert, Gunther; Maertens, Dieter; Pampus, Gottfried; and Witte, Josef, 4,046,710, Cl. 252-429.00B.
Papeteries de Belgique: *See*—
Baumstingl, Herbert, 4,045,939, Cl. 53-22.00A.
Baumstingl, Herbert, 4,045,943, Cl. 53-112.00A.
Papetti, Stelvio, to Foster Grant Co., Inc. Compositions having high impact at low rubber levels. 4,046,839, Cl. 260-880.00R.
Papp, Joseph; Meisterheim, Richard A.; and Hubbard, S. Eugene, to Kawneer Company, Inc. Mechanical accumulator. 4,046,167, Cl. 138-31.000.
Paris, Gerard Yvon; and Cimon, Denis Gaston, to Abbott Laboratories. Glycerides with anti-inflammatory properties. 4,046,887, Cl. 424-232.000.
Parise, Carl; Blackman, Ralph Eugene; and Wimsatt, James M., to Parise & Sons, Inc. Hot water extraction unit having electrical immersion heater. 4,046,989, Cl. 219-437.000.
Parise & Sons, Inc.: *See*—
Parise, Carl; Blackman, Ralph Eugene; and Wimsatt, James M., 4,046,989, Cl. 219-437.000.
Parker, Douglas W. Artificial fishing lure. 4,045,903, Cl. 43-42.110.
Parker & Harper Manufacturing Company, Inc., The: *See*—
Massey, Roger G.; and Holloway, David G., 4,046,350, Cl. 251-58.000.
Parker, Louis W.: *See*—
Hedges, Rhey Warren, 4,047,226, Cl. 358-193.000.
Parsonage, Harry N., to Mead Corporation, The. Apparatus for recycling photographic wash water. 4,045,839, Cl. 15-302.000.
Parsons, Roger R., to Raven Industries, Inc. Hinged control surfaces for pressurized hot air airship. 4,046,337, Cl. 244-96.000.
Passantino, Thomas: *See*—
Dredger, Edward; and Passantino, Thomas, 4,046,392, Cl. 280-8.000.
Patel, Harish A.: *See*—
Libman, Gary; Binard, William J.; and Patel, Harish A., 4,046,138, Cl. 128-2.00F.
Patel, Hiralal V.: *See*—
Klingenberg, James C.; Patel, Hiralal V.; and Morse, Philip W., 4,046,315, Cl. 233-4.000.
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and Di Marco, Aurelio, to Societa' Farmaceutici Italia S.p.A. Daunomycin analogues, their preparation and use. 4,046,878, Cl. 424-180.000.
Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH: *See*—
Busch, Lothar; and Franck, Gunter, 4,047,071, Cl. 313-490.000.
Paterson, Donald MacDougal, deceased; and by Brackenridge, Alexander Robertson, executor. Paper trimmers. 4,046,044, Cl. 83-489.000.
Paton, George A.; Nichols, Sterling M.; and Sanders, John H., to Daw Badische Company. Integral, electrically-conductive textile filament. 4,045,949, Cl. 57-140.0BY.
Pavilanis, Vytautas: *See*—
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Mackay, Angus Campbell, 4,046,811, Cl. 260-578.000.
Paxall, Inc.: *See*—
Silver, Stanley Milton, 4,046,308, Cl. 229-17.00R.
Paxton, Grady W., Jr.; Howeth, Bobby W.; Mehal, Edward W.; Cashion, William F.; and Cashion, Charles M. Optical coupler. 4,047,045, Cl. 250-551.000.
Payeur, Marcel, to Forano Limitee. Circular shear cutting device. 4,046,042, Cl. 83-418.000.
Paynter, John D.; Fuqua, Beverly B.; and Cecil, Richard R., to Exxon Research and Engineering Company. Simplified regeneration procedure. 4,046,673, Cl. 208-140.000.
Pearson, Gerald L.; and Tuma, Harold J., to Spencer Foods, Inc. Meat coring device including a template. 4,046,046, Cl. 83-745.000.
Pearson, James M.; Williams, David J.; and Limburg, William W., to Xerox Corporation. Photoconductive composition containing a tricyanopyrene, article and process of use. 4,046,563, Cl. 96-1.50R.
Pegourie, Jean-Pierre. Pneumatic logic circuits and their integrated circuits. 4,046,159, Cl. 137-112.000.
Peiser, Alfred M., to Mobil Oil Corporation. Simulation of complex sequences of multi-stage separators. 4,047,004, Cl. 235-151.120.
Pelezo, Chris A.: *See*—
Mortimer, George A.; Pelezo, Chris A.; and Richardson, John C., 4,046,731, Cl. 260-30.60R.
Pelletier, Albert: *See*—
McKerrow, George C.; Pelletier, Albert; and Newman, Christopher J., 4,046,323, Cl. 241-23.000.
Peltz, Hanns-Heinz: *See*—
Mitterhummer, Gerhard; Peltz, Hanns-Heinz; Mayer, Heinrich; and Conzelmann, Fritz, 4,045,863, Cl. 29-588.000.
Pen Kem, Inc.: *See*—
Goetz, Philip J., 4,046,667, Cl. 204-299.00R.
Penberthy, Walter L., Jr.: *See*—
Gruesbeck, Clay, Jr.; Penberthy, Walter L., Jr.; and Muecke, Thomas W., 4,046,197, Cl. 166-305.00R.
Penner, Jacob. Truck cover and mechanism for operating same. 4,046,416, Cl. 296-98.000.
Pennington, Keith Samuel: *See*—
Hochberg, Frederick, deceased; and Pennington, Keith Samuel, 4,046,074, Cl. 101-426.000.
Mitchell, Joan LaVerne; Pennington, Keith Samuel; and Hochberg, Frederick, deceased, 4,046,073, Cl. 101-426.000.
Pepe, Enrico J.; and Marsden, James G., to Union Carbide Corporation. Urea silicon product and uses thereof. 4,046,794, Cl. 260-448.20N.
Peppard, Eugene Lee. Tamper-proof ball dispensing mechanism. 4,046,286, Cl. 221-251.000.
Perkins, Frank A., to Harris Corporation. Pseudo-random number sequence generator. 4,047,008, Cl. 235-152.000.
Perotto, Jean Felix; and Vittoz, Eric, to Centre Electronique Horloger S.A. Multi-functional electronic watch. 4,047,010, Cl. 235-156.000.
Perry, Frank. Water vapor injection system for internal combustion engines. 4,046,119, Cl. 123-119.00A.
Perry, George S., to Kraft, Inc. Ice cream carton. 4,046,313, Cl. 206-611.000.

Pertec Corporation: *See—*
Jennings, Alan K., 4,047,158, Cl. 364-900.000.
Peterson, Robert S., to Westinghouse Electric Corporation. Common bus parallel speed regulator system. 4,047,080, Cl. 318-79.000.
Petersson, Jan Ake Sigfrid, to Telefonaktiebolaget L M Ericsson. Contact device. 4,046,447, Cl. 339-103.00M.
Petitpierre, Jean-Claude: *See—*
Garner, Robert; and Petitpierre, Jean-Claude, 4,046,776, Cl. 260-326.14R.
Petro-Tex Chemical Corporation: *See—*
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, 4,046,821, Cl. 260-654.00A.
Petrolite Corporation: *See—*
Bessler, Donald U.; and Tacchi, Kenneth J., 4,046,521, Cl. 44-62.000.
Pews, R. Garth: *See—*
Davis, Ralph A.; and Pews, R. Garth, 4,046,656, Cl. 204-158.0HA.
Pez, Guido P.: *See—*
Armor, John N.; and Pez, Guido P., 4,046,790, Cl. 260-429.500.
Pfeiffer, Heinrich, to Maschinenfabrik J. Dieffenbacher & Co. Press spar for heated panel press. 4,046,500, Cl. 425-407.000.
Pfister, Ronald R.: *See—*
Schwartz, Robert S.; and Pfister, Ronald R., 4,046,150, Cl. 128-328.000.
Philagro S.A.: *See—*
Lacroix, Guy; and Debourge, Jean-Claude, 4,046,883, Cl. 424-209.000.
Phillippi, John F., to Aerodyne Development Corporation. Bag collector for dirt with selective half-bag cleaning. 4,046,526, Cl. 55-96.000.
Phillips, Arthur V. Locking device for a lift. 4,046,019, Cl. 74-29.000.
Phillips, David C.: *See—*
Kaczmarek, Thomas D.; and Phillips, David C., 4,046,512, Cl. 23-253.0TP.
Smith, James D. B.; and Phillips, David C., 4,046,733, Cl. 260-33.6EP.
Smith, James D. B.; and Phillips, David C., 4,046,943, Cl. 428-339.000.
Phillips, Edwin R.; and Stankiewicz, Raymond J., to Sperry Rand Corporation. Multi-jet ink printer using star-wheel jet formers. 4,047,185, Cl. 346-140.00R.
Phillips Petroleum Company: *See—*
Burton, David C., 4,045,854, Cl. 29-235.000.
Cheng, Paul J., 4,046,864, Cl. 423-450.000.
Ford, Gregory A., 4,045,998, Cl. 73-23.100.
Hawkins, Richard T., 4,046,749, Cl. 260-79.000.
Selman, Charles M.; and Uraneck, Carl A., 4,046,745, Cl. 260-77.5CR.
Phillips-Van Heusen Corporation: *See—*
Weaver, Mark, 4,046,253, Cl. 206-278.000.
Pielkenrood, Jacob, to Pielkenrood-Vinitex B.V. Coalescence apparatus. 4,046,698, Cl. 210-513.000.
Pielkenrood-Vinitex B.V.: *See—*
Pielkenrood, Jacob, 4,046,698, Cl. 210-513.000.
Pieper, Helmut, to Sorg GmbH & Co. KG. Glass melting furnace and process for improving the quality of glass. 4,046,547, Cl. 65-135.000.
Pierlot, Michel E., to Societe Industrielle de Brevets et d'Etudes S.I.B.E. Fuel supply devices for internal combustion engines. 4,046,121, Cl. 123-139.0AW.
Pieverling, Klaus V., to Siemens Aktiengesellschaft. Method for the comparative vector measurement of signal pulses arriving nearly simultaneously at several radio receiving stations. 4,047,176, Cl. 343-106.00R.
Pilkington Brothers Limited: *See—*
Hynd, William Christie, 4,046,546, Cl. 65-135.000.
Pinter, Zoltan: *See—*
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.
Piotrowski, Alfred B., to Mobil Oil Corporation. Novel microemulsions. 4,046,519, Cl. 44-51.000.
Piro, Mario, to Nuova San Giorgio S.p.A. Yarn paraffining device. 4,046,102, Cl. 118-78.000.
Pistorius, Rudolf; and Millauer, Hans, to Hoechst Aktiengesellschaft. Process for preparing p-benzoquinone diketals. 4,046,652, Cl. 204-78.000.
Pitan, Roger W.: *See—*
Restad, Everett L.; and Pitan, Roger W., 4,046,391, Cl. 280-5.240.
Pitney-Bowes, Inc.: *See—*
Dlugos, Daniel F.; and Manduley, Flavio M., 4,047,007, Cl. 235-151.330.
Pitt, Richard E., to Owens-Corning Fiberglas Corporation. Method and apparatus for producing glass fibers. 4,046,539, Cl. 65-6.000.
Pittenger, Daniel I., to Zenith Radio Corporation. Multi-arrangement modularized television receiver. 4,047,225, Cl. 358-190.000.
Piziali, Robert L.: *See—*
Clark, Thomas S.; Kennedy, William S.; and Piziali, Robert L., 4,046,131, Cl 124-71.000.
Plampin, James Nelson: *See—*
Rasmussen, Chris Royce; Gardocki, Joseph Francis; and Plampin, James Nelson, 4,046,909, Cl. 424-274.000.
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., to Mobil Oil Corporation. Crystalline zeolite and method of preparing same. 4,046,859, Cl. 423-328.000.
Plantif, Bernard E.: *See—*
Loeb, Jean; and Plantif, Bernard E., 4,045,830, Cl. 5-81.00R.
Plate, Gary G. Rectangular and flat bottom bag and method of manufacture. 4,046,065, Cl. 93-35.0SB.
Platte, Richard L.: *See—*
Virog, John J., Jr.; Von Hagel, Leo; and Platte, Richard L., 4,046,275, Cl. 215-1.00C.
Plessers, Hendrik Sylvester: *See—*
Stievenart, Emile Frans; Plessers, Hendrik Sylvester; Neujens, Georges Jozef; and Van Bouwel, Leo Pa ul, 4,047,193, Cl. 354-105.000.
Plessey Handel und Investments AG: *See—*
Hunt, Brian Keith, 4,046,385, Cl. 274-10.00R.
Plevyak, Joseph B. Box tool. 4,046,037, Cl. 82-35.000.
Plunkett, Allan Barr, to General Electric Company. Adjustable speed A-C motor drive with smooth transition between operational modes and with reduced harmonic distortion. 4,047,083, Cl. 318-231.000.
Poetsch, Dieter, to Robert Bosch G.m.b.H. Automatic color balancing system. 4,047,202, Cl. 358-29.000.
Poggiali, Lewis D., to Olinkraft, Inc. Shipping box. 4,046,309, Cl. 229-23.00R.
Pohjola, Jorma Toivo Tapani. Steering mechanism for endless track vehicles. 4,046,429, Cl. 305-35.0EB.
Pohl, Jens G.: *See—*
United States of America, National Aeronautics and Space Administration; Miller, Charles G.; and Pohl, Jens G., 4,046,462, Cl. 350-295.000.
Polaroid Corporation: *See—*
Coppa, Richard J.; and Gold, Nathan, 4,047,191, Cl. 354-27.000.
Greenwald, Richard B., 4,046,568, Cl. 96-29.00R.
Johnson, Bruce K.; and Whiteside, George D., 4,047,190, Cl. 354-27.000.
Johnson, Bruce K.; Van Allen, David E.; and Whiteside, George D., 4,047,192, Cl. 354-83.000.
Land, Edwin H.; Bloom, Stanley M.; and Rogers, Howard G., 4,046,457, Cl. 350-164.000.
Land, Edwin H., 4,047,213, Cl. 354-299.000.
Poliseo, Joseph W.: *See—*
Bryant, Nelson H.; Hobler, Ross L.; Allen, Wilbur J.; and Poliseo, Joseph W., 4,047,000, Cl. 235-151.100.
Pollak, Zsuszanna B.: *See—*
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,046,765, Cl. 260-288.0CE.
Pollitzer, Ernest L.; and Hayes, John C., to UOP Inc. Hydrocarbon conversion with an acidic multimetallic composite. 4,046,672, Cl. 208-139.000.
Pollitzer, Ernest L.; and Hayes, John C., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,046,828, Cl. 260-673.500.
Pollono, Louis P.; and Mello, Raymond M., to United States of America, Energy Research and Development Administration. Pipe support for use in a nuclear system. 4,046,169, Cl. 138-106.000.
Pool, Eldert B., to Rockwell International Corporation. Lift check valve with dashpot. 4,046,164, Cl. 137-514.700.
Porep, Hans-Jurgen: *See—*
Rosskamp, Gunter; Kolberg, Reiner; Gunzel, Peter; and Porep, Hans-Jurgen, 4,046,146, Cl. 128-266.000.
Porreco, Tom, to Cryogenic Technology, Inc. Elongated cryogenic envelope. 4,046,407, Cl. 285-133.00R.
Porter, Raymond P., to Acushnet Company. Surface layer for windshield wiper blades. 4,045,838, Cl. 15-250.360.
Potters Industries, Inc.: *See—*
Wood, Thomas K.; and Margreither, Alan R., 4,046,548, Cl. 65-142.000.
Powell, Bruce A., to Westinghouse Electric Corporation. Elevator system. 4,046,228, Cl. 187-29.00R.
Powers Manufacturing, Inc.: *See—*
Bryant, Nelson H.; Hobler, Ross L.; Allen, Wilbur J.; and Poliseo, Joseph W., 4,047,000, Cl. 235-151.100.
PPG Industries, Inc.: *See—*
Bissinger, William E., 4,046,912, Cl. 424-300.000.
Schimmel, Karl F.; and Wismer, Marco, 4,046,949, Cl. 428-411.000.
Scriven, Roger L.; and Chang, Wen-Hsuan, 4,046,729, Cl. 260-29.2TN.
Shields, George B., 4,046,543, Cl. 65-25.00A.
Stefanik, John E., 4,046,933, Cl. 428-81.000.
Stefanik, John E., 4,046,951, Cl. 428-412.000.
Zlochower, Isaac A., 4,046,948, Cl. 428-392.000.
Prain, Hunter Douglas: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,046,907, Cl. 424-273.00R.
Precision Engineered Products, Inc.: *See—*
Scott, Eldred D., 4,045,870, Cl. 29-741.000.
Preiser, Herman S.; and Ticker, Arthur. Antifouling system for active ships at rest. 4,046,094, Cl. 114-222.000.
Press, Irving D.; Rink, Helm A.; and Nickerson, Harvey R., to Resistoflex Corporation. Fire-safe jacket for fluid piping components. 4,046,406, Cl. 285-47.000.
Preston, Roger Edwin: *See—*
Foster, Robert; Preston, Roger Edwin; and Robinson, Graham Ernest, 4,046,841, Cl. 260-923.000.
Preus, Paul. Cable connector assembly for oil containment boom. 4,045,962, Cl. 61-1.00F.
Price, Jerome J.; Karsten, Carl G.; and Paggen, William D., to United States of America, Army. Pressure actuated sensor switch with bobbin, trip cord and breakwire. 4,046,976, Cl. 200-61.930.

Prikkel, John, III, to General Motors Corporation. Weatherstrip structure. 4,046,940, Cl. 428-313.000.

Prindle, Geoffrey C.; and Santley, J. Sterling, to Surfglas, Inc. Kickup rudder apparatus having adjustable rake. 4,046,093, Cl. 114-165.000.

Pringle, William L., to United States Steel Corporation. Sofa bed assembly. 4,045,829, Cl. 5-18.00R.

Procter & Gamble Company, The: *See—*
Schaefer, Jean E., 4,045,946, Cl. 53-180.00M.
Smith, Donald Edward, 4,046,886, Cl. 424-227.000.

Produits Chimiques Ugine Kuhlmann: *See—*
Tortai, Jean-Pierre, 4,046,730, Cl. 260-29.6RB.

Prohaska, Raymond James, to Unit Process Assemblies, Inc. Control card receiving and sensing assembly. 4,046,994, Cl. 235-61.11A.

Prontor-Werk, Alfred Gauthier GmbH: *See—*
Espig, Winfried, 4,047,210, Cl. 354-238.000.

Prosen, Emil M., to Neoloy Products, Inc. Dental alloy of use in the adhesion of porcelain. 4,046,561, Cl. 75-172.00R.

Prudenzi, Augusto. Trawler doors. 4,045,901, Cl. 43-9.000.

Puchelt, Manfred; and Seidelberger, Hartmut, to Kraftwerk Union Aktiengesellschaft. Nuclear reactor pressure vessel, multiple measuring line, bushing assembly. 4,046,632, Cl. 176-87.000.

Pugh, William Edward, III, to Bell Telephone Laboratories, Incorporated. Optical fiber connector. 4,046,454, Cl. 350-96.00C.

Pullman Incorporated: *See—*
Adler, Franklin P., 4,046,268, Cl. 214-58.000.
Gutridge, Jack E.; Hallam, Keith J.; and Marsh, Ronald W., 4,046,081, Cl. 105-326.000.
Tedesco, George A.; and Stark, Marvin, 4,046,082, Cl. 105-377.000.

Purdon, Jac Eduard. Cigar-cigarette perforating devices. 4,046,152, Cl. 131-170.00R.

Purolator, Inc.: *See—*
Mouwen, Herman Charles, 4,046,696, Cl. 210-431.000.

Purzycki, Alfred Z.: *See—*
LaSpesa, Richard E.; and Purzycki, Alfred Z., 4,046,247, Cl. 197-168.000.

Puschel, Walter: *See—*
Odenwalder, Heinrich; Ranz, Erwin; Puschel, Walter; and Vetter, Hans, 4,046,574, Cl. 96-99.000.

Pusineri, Christian, to Rhone-Poulenc Industries. Polyurethanes for articles for medical usage. 4,046,725, Cl. 260-9.000.

Puskas, Imre; and Fields, Ellis K., to Standard Oil Company (Indiana). Dibenzofuran-2,3,6,7-tetracarboxylic acid dianhydride. 4,046,779, Cl. 260-346.220.

Putnam, Lowell E.: *See—*
Sheahan, James P.; and Putnam, Lowell E., 4,045,934, Cl. 52-514.000.

Putter, Rolf: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,046,796, Cl. 260-453.00P.

Putti, George, to Dyform Concrete (Prestressed) Ltd. Extrusion machine for making articles of cement-like material. 4,046,848, Cl. 264-70.000.

Pye, Donald George, to Du Pont de Nemours, E. I., and Company. Christiansen cells containing epoxy gelling agents. 4,046,567, Cl. 96-27.00R.

Quaker Oats Company, The: *See—*
Burkwall, Morris P., Jr., 4,046,922, Cl. 426-104.000.

Quinlivan, Richard Paul, to General Electric Company. Aircraft angle-of-attack and sideslip estimator. 4,046,341, Cl. 244-181.000.

Raether, Wolfgang: *See—*
Winkelmann, Erhardt; and Raether, Wolfgang, 4,046,896, Cl. 424-263.000.

Raleigh Industries Limited: *See—*
Winch, Andrew Gordon, 4,045,852, Cl. 29-159.020.

Ramsey, Robert W.: *See—*
Anderson, Richard M.; McGill, Robert S., III; and Ramsey, Robert W., 4,045,973, Cl. 62-158.000.

Randell, Donald Richard: *See—*
Holt, Brian; and Randell, Donald Richard, 4,046,737, Cl. 260-45.80N.

Randmae, Rein, to Vicon Industries, Inc. Attenuation spot filters manufacturing process. 4,046,929, Cl. 427-164.000.

Ransley, Derek L., to Chevron Research Company. Process for selective hydrogenation of ethylbenzene. 4,046,824, Cl. 260-667.000.

Ranz, Erwin: *See—*
Odenwalder, Heinrich; Ranz, Erwin; Puschel, Walter; and Vetter, Hans, 4,046,574, Cl. 96-99.000.

Ranzanigo, Pierluigi. System for interchangeable attachment of electrical equipment. 4,046,449, Cl. 339-126.00R.

Rao, Dhulipala M., to Westinghouse Electric Corporation. Frequency compensated differential amplifier. 4,047,122, Cl. 330-84.000.

Rasberger, Michael; Rody, Jean; Moser, Paul; and Muller, Helmut, to Ciba-Geigy Corporation. Nickel stabilizers for synthetic polymers. 4,046,788, Cl. 260-404.000.

Raskay, Bela: *See—*
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Rasmussen, Chris Royce; Gardocki, Joseph Francis; and Plampin, James Nelson, to McNeil Laboratories, Incorporated. Pyrrolidylidene, piperidylidene and hexahydroazepinylidene ureas as CNS depressants. 4,046,909, Cl. 424-274.000.

Ratzkoff, George L. Word game apparatus. 4,046,382, Cl. 273-135.00B.

Raufeisen, Robert: *See—*
Salzgeber, Daniel Edwin; Raufeisen, Robert; and Davis, Charles W., 4,046,494, Cl. 417-253.000.

Raven Industries, Inc.: *See—*
Parsons, Roger R., 4,046,337, Cl. 244-96.000.

Ray, Neil Hunter: *See—*
Lewis, Cyril John; Carter, Neil; and Ray, Neil Hunter, 4,046,540, Cl. 65-18.000.

Raytheon Company: *See—*
Appelbaum, Alfred J.; Collins, Michael J.; and Hanfling, Jerome D., 4,047,179, Cl. 343-768.000.
Schloemann, Ernst F. R. A., 4,046,679, Cl. 209-212.000.

Raza, Hassan: *See—*
McCaffrey, Terence; Raza, Hassan; and Williams, Bruce C., 4,047,217, Cl. 357-34.000.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,047,054, Cl. 307-252.00J.
Ahmed, Adel Abdel Aziz, 4,047,057, Cl. 307-273.000.
Kirschner, Thomas Francis, 4,046,384, Cl. 274-47.000.
Lambert, Herbert Paul, 4,046,606, Cl. 148-187.000.
Rosenthal, Bruce David, 4,047,059, Cl. 307-355.000.
Thall, Earle Solomon, 4,045,849, Cl. 29-25.130.
White, Joseph Paul; and Kannam, Peter Joseph, 4,047,196, Cl. 357-55.000.

Reale, Michael J.: *See—*
Stanaback, Robert J.; and Reale, Michael J., 4,046,719, Cl. 260-2.5FP.

Reavis, Robert Philmore, Jr., to AMP Incorporated. Electrical terminal for joining two wires. 4,046,446, Cl. 339-99.00R.

Reckel, Rudolph P., to Ortho Diagnostics Inc. Compositions and serological methods including bovine serum albumin polymers. 4,046,871, Cl. 424-11.000.

Redelman, Paul E.; and Busam, Donald H., to Interlake, Inc. Warehouse storage system with a multivehicle arrangement having power coupling means. 4,046,267, Cl. 214-16.40B.

Redford, David A.: *See—*
Cram, Phillip J.; and Redford, David A., 4,046,195, Cl. 166-272.000.

Reece, Albert Benjamin John; and Walkden, Anthony John, to General Electric Company Limited, The. Liquid metal slip-ring arrangement for a dynamo electric machine. 4,047,063, Cl. 310-232.000.

Reed, Charles C.: *See—*
Cooley, Denton A.; Reed, Charles C.; and Sharp, Russell G., 4,045,859, Cl. 29-451.000.

Reed, William H.: *See—*
Bauerle, James E.; Reed, William H.; and Berkey, Edgar, 4,047,101, Cl. 324-33.000.

Regent Sports Corporation: *See—*
Khazzam, Joseph N., 4,046,377, Cl. 273-73.00G.

Reier, Richard; and Kuelzer, Peter, to Siemens Aktiengesellschaft. Method of making needle guide devices for mosaic printers. 4,046,303, Cl. 228-173.000.

Reinhard, Russell R.: *See—*
Dorawala, Tansukhlal G.; and Reinhard, Russell R., 4,046,869, Cl. 423-652.000.

Reinhardt, Bruce A.: *See—*
Harris, Frank W.; and Reinhardt, Bruce A., 4,046,814, Cl. 260-590.00E.

Reinhardt, Helmut; Gratzfeld, Everhard; and Clausen, Eva, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of ferrocyanide blue. 4,046,861, Cl. 423-367.000.

Reinhardt, James Donald, to Cardinal Extrusions Co. Mat-retaining spring for picture frame. 4,045,898, Cl. 40-156.000.

Rembaum, Alan; Yen, Shiao-Ping S.; and Dreyer, William J., to California Institute of Technology. Crosslinked, porous, polyacrylate beads. 4,046,720, Cl. 260-2.50B.

Rembaum, Alan, to California Institute of Technology. Ionene modified small polymeric beads. 4,046,750, Cl. 526-310.000.

Renth, Ernst-Otto: *See—*
Mentrup, Anton; Schromm, Kurt; Renth, Ernst-Otto; and Traunecker, Werner, 4,046,913, Cl. 424-311.000.

Repke, Virginia L.: *See—*
Mesek, Frederick K.; and Repke, Virginia L., 4,045,833, Cl. 5-335.000.

Resistoflex Corporation: *See—*
Press, Irving D.; Rink, Helm A.; and Nickerson, Harvey R., 4,046,406, Cl. 285-47.000.

Ress, Thomas I.; and Nolde, George V., to Kreidl Chemico Physical K.G. Synchronous plasma packet accelerator. 4,047,068, Cl. 313-359.000.

Restad, Everett L.; and Pitan, Roger W., to Nutting Truck and Caster Company. Stair climbing and descending attachment for a hand truck. 4,046,391, Cl. 280-5.240.

Rexnord Inc.: *See—*
Woodward, Thomas D.; and Worsley, Gail G., 4,045,980, Cl. 64-23.000.

Reymann, Wolfgang: *See—*
Appel, Adolf; and Reymann, Wolfgang, 4,046,498, Cl. 425-526.000.

Rhone-Poulenc Industries: *See—*
Gruffaz, Max; and Locatelli, Jean-Louis, 4,046,835, Cl. 260-857.0PA.
Pusineri, Christian, 4,046,725, Cl. 260-9.000.

Rice, Stephen H.; Spencer, Rodney S.; and Fleetwood, Charles M., Jr., to United States of America, National Aeronautics and Space Administration. Method of treating the surface of a glass member. 4,046,619, Cl. 156-645.000.

Richard, Raymond L., Jr., to General Motors Corporation. Impact

energy absorbing mounting unit for mounting an automotive vehicle bumper assembly. 4,046,411, Cl. 293-88.000.

Richards, Elmer A.: *See—*
Braun, Eugene R.; and Richards, Elmer A., 4,046,032, Cl. 74-865.000.

Richardson Company, The: *See—*
Meiner, Roger D.; Haines, James M.; and Alsberg, Henry, 4,046,726, Cl. 260-27.00R.
Muzyczko, Thaddeus M.; and Jones, Thomas H., 4,046,577, Cl. 96-115.00R.

Richardson, John C.: *See—*
Mortimer, George A.; Pelezo, Chris A.; and Richardson, John C., 4,046,731, Cl. 260-30.60R.

Richardson-Merrell Inc.: *See—*
Djurickovic, Slobodan M., 4,046,875, Cl. 424-89.000.

Richardson, Norman: *See—*
Smith, Malcolm John; Miles, Peter; Richardson, Norman; and Finan, Michael Anthony, 4,046,707, Cl. 252-180.000.

Richardson, William H., to City Products Corporation. Indicator device for a garment hanger. 4,045,899, Cl. 40-322.000.

Rickert, Paul Ellis, to Borg-Warner Corporation. Carburetor construction. 4,046,844, Cl. 261-34.00A.

Ricoh Co., Ltd.: *See—*
Kato, Saburo; and Takemoto, Takeshi, 4,046,334, Cl. 242-201.000.
Kume, Tsutomu; Kasai, Kazuo; Kaneko, Hidefumi; Sugiyama, Shigeo; and Mithuhashi, Shigeo, 4,047,230, Cl. 360-17.000.

Ridler, Keith Douglas: *See—*
Gosling, Alexander Bennett; Ridler, Keith Douglas; Easthope, Frederick James; and Stanwell-Smith, Colin Howard, 4,046,386, Cl. 274-23.00A.

Riedl, Frederick J.; and Schimmelpfennig, George A., to UOP Inc. Glass sampling tube. 4,046,015, Cl. 73-421.50R.

Riemens, Karel: *See—*
Bijker, Arnold Jan; and Riemens, Karel, 4,047,108, Cl. 325-38.00B.

Riffer, Richard, to California and Hawaiian Sugar Company. Process for the production of a colorless sugar syrup from cane molasses. 4,046,590, Cl. 127-46.00B.

Riganati, John P.: *See—*
Vitols, Visvaldis A.; and Riganati, John P., 4,047,154, Cl. 340-146.30E.

Rijsenbrij, Joannes C.: *See—*
Wormmeester, Gerhardus J.; and Rijsenbrij, Joannes C., 4,046,265, Cl. 214-14.000.

Rikagaku Kenkyusho: *See—*
Wada, Masami; Kodama, Masahiro; and Kawasaki, Shinkichi, 4,047,042, Cl. 250-390.000.

Rilling, Raymond J.: *See—*
Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., 4,046,200, Cl. 172-14.000.

Riner, Victor: *See—*
Juillard, Yves; and Riner, Victor, 4,046,170, Cl. 139-20.000.

Rink, Helm A.: *See—*
Press, Irving D.; Rink, Helm A.; and Nickerson, Harvey R., 4,046,406, Cl. 285-47.000.

Ripley, Mervyn. Automatic boiler damper. 4,046,318, Cl. 236-1.00G.

Rippere, Ralph E. Production of multi-metal particles for powder metallurgy alloys. 4,046,643, Cl. 204-10.000.

Roben, Hermann: *See—*
Baxmann, Fritz; Frese, Albert; Roben, Hermann; and Wolpers, Jurgen, 4,046,945, Cl. 428-282.000.

Robert Bosch G.m.b.H.: *See—*
Jakob, Gert; and Goetzke, Siegfried, 4,047,242, Cl. 361-389.000.
Messerschmidt, Friedrich, 4,046,478, Cl. 403-262.000.
Poetsch, Dieter, 4,047,202, Cl. 358-29.000.
Schlagmuller, Walter; and Babitzka, Rudolf, 4,046,240, Cl. 192-104.00C.

Roberts, Patrick S., to Warwick Electronics Inc. Note selector circuit for electronic musical instrument. 4,046,047, Cl. 84-1.010.

Robinson, Charles Elbert. Motor speed sensor. 4,047,106, Cl. 324-175.000.

Robinson, Graham Ernest: *See—*
Foster, Robert; Preston, Roger Edwin; and Robinson, Graham Ernest, 4,046,841, Cl. 260-923.000.

Robinson, Kenneth R.: *See—*
Langer, Heimo J.; Robinson, Kenneth R.; and Throckmorton, Peter E., 4,046,812, Cl. 260-583.00B.

Robinson, Michael, to Laporte Industries Limited. Production of titanium tetrachloride. 4,046,853, Cl. 423-77.000.

Robinson, Myron L., to Simekus, Inc. Meter for measuring syrup ratio in soft drinks and the like. 4,047,100, Cl. 324-30.00B.

Roblin Industries, Inc.: *See—*
Thompson, William A., Jr., 4,046,394, Cl. 280-33.99B.

Rock, Erich; and Mages, Bernhard. Hinge. 4,045,841, Cl. 16-129.000.

Rockwell International Corporation: *See—*
Ehman, Michael F.; and Austerman, Stanley B., 4,046,954, Cl. 428-446.000.
French, Barry T., 4,047,216, Cl. 357-24.000.
Lee, Soo N., 4,046,474, Cl. 355-43.000.
Lim, Teong C.; Tarakci, Umit; and Vasile, Carmine F., 4,047,130, Cl. 333-72.000.
Pool, Eldert B., 4,046,164, Cl. 137-514.700.
Vitols, Visvaldis A.; and Riganati, John P., 4,047,154, Cl. 340-146.30E.

Rode, France: *See—*
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; Baum, Allen J.; Cochran, David S.; and Tung, Chung C., 4,047,012, Cl. 235-156.000.

Rodeghiero, Reno Antonio, to Deere & Company. Modulation control valve for clutches. 4,046,162, Cl. 137-489.000.

Rodgers, Billy R.; and Edwards, Michael S., to United States of America, Energy Research and Development Administration. Filtering coal-derived oil through a filter media precoated with particles partially solubilized by said oil. 4,046,690, Cl. 210-75.000.

Rodriguez, Claude: *See—*
Ammon, J. Preston; Weaver, Harry R.; and Rodriguez, Claude, 4,045,868, Cl. 29-629.000.

Rody, Jean: *See—*
Rasberger, Michael; Rody, Jean; Moser, Paul; and Muller, Helmut, 4,046,788, Cl. 260-404.000.

Roeder, Malcholm O. Tennis ball preserver. 4,046,491, Cl. 417-44.000.

Roehr, Kuno M.: *See—*
Finkemeyer, Karl-Friedrich; Roehr, Kuno M.; and Sonntag, Guenther, 4,047,244, Cl. 364-200.000.

Rogers, Barry William, to Bell Telephone Laboratories, Incorporated. Called party fraud detection in an automated coin system. 4,046,962, Cl. 179-6.30R.

Rogers, Howard G.: *See—*
Land, Edwin H.; Bloom, Stanley M.; and Rogers, Howard G., 4,046,457, Cl. 350-164.000.

Rogers, Jimmy Dale: *See—*
Lord, Harold Wilbur; and Rogers, Jimmy Dale, 4,047,120, Cl. 330-207.00P.

Rohm and Haas Company: *See—*
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,046,798, Cl. 260-465.00D.
Costin, Charles Richard, 4,046,766, Cl. 260-290.0HL.
Cunningham, Virginia L.; Clovis, James S.; and Hurwitz, Marvin J., 4,046,688, Cl. 210-37.00R.
Jenkins, Raymond F., 4,046,744, Cl. 260-77.5AQ.

Rohr, Robert Lewis: *See—*
Kendall, Arthur Harry; and Rohr, Robert Lewis, 4,047,186, Cl. 346-140.00R.

Roitershtein, Semen Semenovich: *See—*
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.

Rolls-Royce (1971) Limited: *See—*
Gardner, Charles Stanley; and Molloy, Denis Edward, 4,046,662, Cl. 204-275.000.

Roman, Richard C. Dental drill guide attachment. 4,045,874, Cl. 32-40.00R.

Romano, Antonio, to Ing. C. Olivetti & C., S.p.A. Line control unit for teleprinters. 4,047,055, Cl. 307-262.000.

Romano, Ugo: *See—*
Moggi, Pietro Antonio; and Romano, Ugo, 4,046,810, Cl. 260-571.000.

Romanov, Vladimir Ivanovich: *See—*
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.

Ronzio, Richard A.: *See—*
Vertes, Michael A.; Ronzio, Richard A.; and Kearns, Tommy C., 4,046,852, Cl. 423-58.000.

Roop, Raymond M.: *See—*
Clark, Lowell E.; Roop, Raymond M.; and Volk, Charles E., 4,047,218, Cl. 357-34.000.

Root, Ernest F.; Kunica, Serge; and Simmons, Harry M., to Itek Corporation. Highly efficient solar collector including means for preventing cover plate fluid condensation. 4,046,135, Cl. 126-271.000.

Root, Robert S.; Taylor, Frederick P.; and MacKendrick, William J., to Lipe-Rollway Corporation. Clutch with torque limiting brake. 4,046,237, Cl. 192-13.00R.

Rosa, Richard J., to United States of America, Energy Research and Development Administration. MHD generator with improved network coupling electrodes to a load. 4,047,094, Cl. 322-7.000.

Rose, Byron W., to United States Steel Corporation. Plastic fence posts and enclosures. 4,046,356, Cl. 256-10.000.

Rose, Maria M., to Medtronic, Inc. Body implantable lead with stiffening stylet. 4,046,151, Cl. 128-404.000.

Rose, Robert C., Sr.; and McClelland, Harold H., to IBEC Industries, Inc. Valve-positioning apparatus. 4,046,165, Cl. 137-624.270.

Rosebrock, Frederick Allen, to Bell Telephone Laboratories, Incorporated. Cam actuated switch. 4,046,980, Cl. 200-153.0LA.

Rosenthal, Bruce David, to RCA Corporation. Comparator circuit. 4,047,059, Cl. 307-355.000.

Rosinski, Edward J.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,046,859, Cl. 423-328.000.

Rosler, Peter, to Hilti Aktiengesellschaft. Packing container for objects of variable lengths. 4,046,279, Cl. 220-8.000.

Rosser, William D.: *See—*
Kuo, Samuel Chung-Shu; and Rosser, William D., 4,047,180, Cl. 343-784.000.

Rosskamp, Gunter; Kolberg, Reiner; Gunzel, Peter; and Porep, Hans-Jurgen, to Schering Aktiengesellschaft. Apparatus for the inhalation of medicinal agents. 4,046,146, Cl. 128-266.000.

Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, to Bayer Aktiengesellschaft. Process for the production of polyfunctional cyanic acid esters. 4,046,796, Cl. 260-453.00P.

Roussel Uclaf: *See—*
Hardy, Michel; and Humbert, Daniel, 4,046,902, Cl. 424-270.000.
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, 4,046,901, Cl. 424-267.000.

Rowland, George Ferdinand, to G. D. Searle & Co. Limited. Immunological materials. 4,046,722, Cl. 260-6.000.

Rowland, Walter: *See—*
Sopcak, James E.; and Rowland, Walter, 4,045,996, Cl. 73-1.00R.

Rubenstein, Kenneth E.: *See—*
Ullman, Edwin F.; and Rubenstein, Kenneth E., 4,046,636, Cl. 195-63.000.

Rubin, Mae K.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,046,859, Cl. 423-328.000.

Ruby, Harry M.: *See—*
Klees, Gerard T.; Meacham, Robert A.; Ruby, Harry M.; and Sich, Edward, 4,046,415, Cl. 296-35.00R.

Ruch, Heinz, to Albert Obrist & Co. Molded plastic covers for containers. 4,046,282, Cl. 220-270.000.

Rudolf Schadow, GmbH: *See—*
Schadow, Rudolf; and Michalski, Dieter, 4,046,982, Cl. 200-159.00R.

Rudszinat, Willy, to Hauni-Werke Korber & Co. KG. Apparatus for transmitting motion to tools in cigarette packing machines or the like. 4,046,027, Cl. 74-567.000.

Rulison, Richard N.: *See—*
Ashare, Edward; Rulison, Richard N.; Wright, Lawrence T.; and Coplan, Myron J., 4,045,851, Cl. 29-157.00R.

Rusche, Fredric. Casingless pile method and apparatus. 4,045,966, Cl. 61-53.640.

Rushmere, John Derek, to Du Pont de Nemours, E. I., and Company. Polyamine additives in alkaline zinc electroplating. 4,046,648, Cl. 204-55.00R.

Russell, Carolyn G. Weaving device. 4,046,172, Cl. 139-33.000.

Ruti Machinery Works Ltd.: *See—*
Smutny, Viktor, 4,046,224, Cl. 184-15.00R.

Rutshtein, Alexander; and Staroselsky, Naum, to Compressor Controls Corporation. Method and apparatus for antisurge protection of a dynamic compressor. 4,046,490, Cl. 417-28.000.

Rutter, Harold T., to Sunnen Products Company. Retractable dial bore gauge. 4,045,877, Cl. 33-178.00R.

Ryan, Marshall John, to Lockformer Company, The. Sheet metal bending apparatus. 4,045,989, Cl. 72-133.000.

Ryan, Wilfred Edward. Identification kit and method. 4,045,883, Cl. 35-28.000.

Rydbeck, Nils R. C.; and Sundberg, Carl-Erik Wilhelm. Adaptive error correcting transmission system. 4,047,151, Cl. 340-146.1AX.

Rzeszewski, Theodore S., to Matsushita Electric Corporation of America. Auxiliary signal processing circuit. 4,047,227, Cl. 358-194.000.

S&C Electric Company: *See—*
Bernatt, Joseph; and Guleserian, John E., 4,047,142, Cl. 337-186.000.

Saito, Hirokazu: *See—*
Tada, Sugihiko; Nakai, Setsuo; Irie, Kazuo; Saito, Hirokazu; and Suzuki, Hideaki, 4,046,154, Cl. 134-65.000.

Saito, Naoki: *See—*
Akutsu, Hidezo; Iwama, Katsuaki; Saito, Naoki; Takagawa, Masanori; Kobayashi, Yoshichika; and Atsumi, Tamisuke, 4,047,069, Cl. 313-487.000.

Saito, Shinroku, to Shinagawa Firebrick Co., Ltd. Dry rubber compression molding apparatus. 4,046,499, Cl. 425-405.00H.

Saito, Toranosuke; Kohno, Jujiro; Tanaka, Daiichiro; and Oda, Shinichi, to Sanko Chemical Company Ltd.; and Kanzaki Paper Manufacturing Company, Ltd. Support sheet with sensitized coating of organic acid substance and organic high molecular compound particulate mixture. 4,046,941, Cl. 428-323.000.

Saitoh, Kozo; Tanaka, Hiroshi; Nagahama, Tatsuya; and Izumi, Sumio, to Mitsui Mining & Smelting Co., Ltd. Method for separating large-sized film-like plastics. 4,046,677, Cl. 209-166.000.

Sakamoto, Tsunenori: *See—*
Tarui, Yasuo; Sakamoto, Tsunenori; and Komiya, Yoshio, 4,046,594, Cl. 136-89.0SJ.

Sakamoto, Yoichi, to Matsushita Electric Industrial Co., Ltd. Channel selector employing variable capacitance elements for tuning. 4,047,112, Cl. 325-455.000.

Sakamoto, Yoshio; and Kominami, Yasuo, to Hitachi, Ltd. Transistor amplifier circuit. 4,047,118, Cl. 330-22.000.

Sakasai, Toshio: *See—*
Akao, Takeshi; Sakasai, Toshio; Matsuyama, Yoshikazu; and Kasuga, Yukio, 4,046,921, Cl. 426-46.000.

Sakashita, Nobuyuki: *See—*
Takahashi, Ryohei; Fujikawa, Kanichi; Yokomichi, Isao; Tsujii, Yasuhiro; and Sakashita, Nobuyuki, 4,046,553, Cl. 71-94.000.

Sakurada, Nobuaki: *See—*
Mashimo, Yukio; Sakurada, Nobuaki; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,047,187, Cl. 354-23.00D.

Sala Magnetics, Inc.: *See—*
Marston, Peter G.; and Nolan, John J., 4,046,681, Cl. 209-224.000.

Salathiel, William M.: *See—*
Gruesbeck, Clay; Salathiel, William M.; Muecke, Thomas W.; and Cooke, Claude E., Jr., 4,046,198, Cl. 166-278.000.

Salimbeni, Aldo: *See—*
Manghisi, Elso; and Salimbeni, Aldo, 4,046,762, Cl. 544-148.000.

Salley, Ernest J., to Engineered Systems, Inc. Memory fullness indicator. 4,046,995, Cl. 235-61.60R.

Salpeter, Jerome: *See—*
Judge, John F. X.; and Salpeter, Jerome, 4,047,032, Cl. 250-338.000.

Salzgeber, Daniel Edwin; Raufeisen, Robert; and Davis, Charles W., to Stanadyne, Inc. Fuel injection pump and replaceable check valve therefor. 4,046,494, Cl. 417-253.000.

Samecima, Muneyasu: *See—*
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, 4,046,785, Cl. 260-380.000.

Samour, Carlos M.; and Vida, Julius A., to Bristol-Myers Company. Certain barbituric acid derivatives used as anticonvulsant agents. 4,046,894, Cl. 424-254.000.

Sample, Steven B.: *See—*
Scheuer, Paul R.; Cox, Karmen D.; and Sample, Steven B., 4,047,082, Cl. 318-221.00E.

Samuelsson, Frank A. Tennis ball container indicating players turns. 4,046,284, Cl. 221-45.000.

Sanders, John H.: *See—*
Paton, George A.; Nichols, Sterling M.; and Sanders, John H., 4,045,949, Cl. 57-140.0BY.

Sandoz Ltd.: *See—*
Maderni, Piero; and Mueller, Curt, 4,046,756, Cl. 260-205.000.
Meybeck, Jacques; Mueller, Curt; and Mueller, Fred, 4,046,757, Cl. 260-207.000.
Moser, Helmut; and von Tobel, Hans, 4,046,502, Cl. 8-7.000.
Scholtysik, Gunter, 4,046,917, Cl. 424-326.000.

Sanford, Leon M.; and Wu, Che-Kuang, to Corning Glass Works. Method for making molded glass articles having bulk homogeneity and optical quality surface. 4,046,545, Cl. 65-30.00R.

Sanko Chemical Company Ltd.: *See—*
Saito, Toranosuke; Kohno, Jujiro; Tanaka, Daiichiro; and Oda, Shinichi, 4,046,941, Cl. 428-323.000.

Sano, Takezo; Shimomura, Takatoshi; and Sasaki, Masao, to Sumitomo Chemical Company, Limited. Process for preparing membranes for separation of substances. 4,046,843, Cl. 264-22.000.

Sanson, Joseph F. Manufacture of cushions. 4,046,611, Cl. 156-79.000.

Santley, J. Sterling: *See—*
Prindle, Geoffrey C.; and Santley, J. Sterling, 4,046,093, Cl. 114-165.000.

Sardinha, Manuel Domingos. Wheel. 4,046,425, Cl. 301-12.00R.

Sasaki, Masao: *See—*
Sano, Takezo; Shimomura, Takatoshi; and Sasaki, Masao, 4,046,843, Cl. 264-22.000.

Sasaki, Shosuke, to Sasaki, Shosuke; and Sasaki Takashi. Distillatory apparatus. 4,046,637, Cl. 202-174.000.

Sasaki Takashi: *See—*
Sasaki, Shosuke, 4,046,637, Cl. 202-174.000.

Sato, Akira: *See—*
Hinata, Masanao; Mihara, Yuji; Sato, Akira; and Ikeda, Tadashi, 4,046,572, Cl. 96-69.000.

Sato, Masaaki, to Olympus Optical Co., Ltd. Combined portable tape recorder and stereophonic receiver system. 4,046,973, Cl. 179-100.110.

Satto, Seiichi, to Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.). Moving magnet type instrument. 4,047,136, Cl. 335-222.000.

Sauer, Charles A., to Swiss Aluminium Ltd. Thermocouple for continuously measuring the temperature along the length of a surface. 4,046,009, Cl. 73-359.00R.

Saunders, Howard E.: *See—*
Westervelt, Dean C.; Scala, Luciano C.; Saunders, Howard E.; and Ciliberti, David F., 4,046,592, Cl. 134-1.000.

Scala, Luciano C.: *See—*
Westervelt, Dean C.; Scala, Luciano C.; Saunders, Howard E.; and Ciliberti, David F., 4,046,592, Cl. 134-1.000.

Scanlan, Robert J. Conduit clamping device. 4,046,344, Cl. 248-72.000.

Schachter, Joseph D. Imprinted compressible foam article and method of manufacture. 4,046,936, Cl. 428-195.000.

Schadow, Rudolf; and Michalski, Dieter, to Rudolf Schadow, GmbH. Switch means for short-stroke push-button keys. 4,046,982, Cl. 200-159.00R.

Schaefer, Dieter: *See—*
Hartmann, Hans-Joerg; Falk, Roland; Gawlik, Peter; Balz, Werner; Uhl, Karl; Schaefer, Dieter; and Motz, Herbert, 4,046,932, Cl. 428-64.000.

Schaefer, Jean E., to Procter & Gamble Company, The. Apparatus for continuously forming and filling tampon sacks. 4,045,946, Cl. 53-180.00M.

Schafer, Rolf, to Bayer Aktiengesellschaft. Process for producing sodium chloride brines suitable for electrolysis. 4,046,865, Cl. 423-499.000.

Schafft, Hugo Willy, to Motorola, Inc. Acoustic transducer with elastomeric coupling. 4,047,060, Cl. 310-322.000.

Schanz, Klaus: *See*—
Schepers, Bernhard; Bayer, Gerhard; Urmann, Ernst; and Schanz, Klaus, 4,046,855, Cl. 423-130.000.
Schaub, Robert Eugene; and Weiss, Martin Joseph, to American Cyanamid Company. Novel 15-substituted prostanoic acids and esters. 4,046,787, Cl. 260-399.000.
Schaul, Joseph B.: *See*—
Bland, Herbert; and Schaul, Joseph B., 4,046,297, Cl. 224-42.03B.
Scheidler, Rollin G.: *See*—
Taylor, Philip W.; and Scheidler, Rollin G., 4,046,957, Cl. 174-72.00A.
Scheinpflug, Hans: *See*—
Dahn, Ursula; Hagenmaier, Hanspaul; Hohne, Helmut; Konig, Wilfried; Scheinpflug, Hans; and Zahner, Hans, 4,046,881, Cl. 424-181.000.
Schepers, Bernhard; Bayer, Gerhard; Urmann, Ernst; and Schanz, Klaus, to Gebruder Giulini GmbH. Method for removing harmful organic compounds from aluminate liquors of the Bayer process. 4,046,855, Cl. 423-130.000.
Scher, Herbert B., to Stauffer Chemical Company. Post-treatment of polyurea microcapsules. 4,046,741, Cl. 260-77.50A.
Scherer, Lorenz: *See*—
Eggenmuller, Alfred; Bellan, Heinrich; Scherer, Lorenz; Notter, Eugen; and Wagler, Werner, 4,046,068, Cl. 100-65.000.
Schering Aktiengesellschaft: *See*—
Rosskamp, Gunter; Kolberg, Reiner; Gunzel, Peter; and Porep, Hans-Jurgen, 4,046,146, Cl. 128-266.000.
Scheuer, Paul R.; Cox, Karmen D.; and Sample, Steven B., to Design & Manufacturing Corporation. Variable threshold starting circuit for induction motor. 4,047,082, Cl. 318-221.00E.
Scheurecker, Werner: *See*—
Kagerhuber, Franz; and Scheurecker, Werner, 4,046,188, Cl. 164-282.000.
Schierz, Winfried, to SEMIKRON Gesellschaft fur Gleichrichterbau und Elektronik m.b.H. Housing and lead structure for a series connected semiconductor rectifier arrangement. 4,047,197, Cl. 357-81.000.
Schimmel, Karl F.; and Wismer, Marco, to PPG Industries, Inc. Novel polymers from reaction of tricarboxylic anhydrides and hydrazines or hydrazides coated on substrate. 4,046,949, Cl. 428-411.000.
Schimmelpfennig, George A.: *See*—
Riedl, Frederick J.; and Schimmelpfennig, George A., 4,046,015, Cl. 73-421.50R.
Schindehutte, Manfred: *See*—
Dieling, Hans; and Schindehutte, Manfred, 4,046,080, Cl. 105-133.000.
Schirtzinger, Joseph F., to Sea-Log Corporation. Apparatus for supporting a drilling platform on the ocean floor. 4,045,967, Cl. 61-86.000.
Schladitz, Hermann J. Methods of manufacturing bodies of conglomerated particles. 4,046,302, Cl. 228-121.000.
Schlaf, Helmut: *See*—
Sextro, Gunter; Burg, Karlheinz; Leugering, Hans Joachim; Schlaf, Helmut; and Heller, Alwin, 4,046,738, Cl. 260-67.0FP.
Schlagmuller, Walter; and Babitzka, Rudolf, to Robert Bosch G.m.b.H. Centrifugal friction clutch. 4,046,240, Cl. 192-104.00C.
Schloemann, Ernst F. R. A., to Raytheon Company. Magnetic drum materials separator. 4,046,679, Cl. 209-212.000.
Schlosser, Philip A.; and Steidley, John W., to Ohio State University, The. Gamma ray camera for nuclear medicine. 4,047,037, Cl. 250-370.000.
Schluenz, Robert William; and Davis, Curry Beach, to Arizona Chemical Company. Polymers of terpene-maleic anhydride adducts with aliphatic diamines. 4,046,748, Cl. 260-78.0UA.
Schlumberger Technology Corporation: *See*—
Bateman, Richard M.; and Clavier, Christian M., 4,047,027, Cl. 250-264.000.
Schmelzer, Gunther: *See*—
Bigalke, Erhard; Wolf, Jurgen; and Schmelzer, Gunther, 4,046,129, Cl. 123-32.0EA.
Schmerling, Louis, to UOP Inc. Alkylation of alkyl, cycloalkyl and aralkyl halides. 4,046,819, Cl. 260-648.00R.
Schmid, Heinrich, to J. M. Voith GmbH. Apparatus for shifting component parts of paper machines. 4,046,623, Cl. 162-306.000.
Schmidt, Kees J., to Hoogovens IJmuiden B.V. Method and device for granulating blast furnace slag. 4,046,542, Cl. 65-19.000.
Schmitt, Karl. Swivel chair. 4,046,419, Cl. 297-153.000.
Schoberl, Werner, to Licentia-Patent-Verwaltungs-G.m.b.H. Encapsulated light-emitting diode structure and array thereof. 4,047,075, Cl. 313-500.000.
Scholten, Frank Lynn: *See*—
Booth, Thomas Allan; and Scholten, Frank Lynn, 4,046,475, Cl. 355-69.000.
Scholten, Heinz: *See*—
Capelle, Anton; and Scholten, Heinz, 4,046,747, Cl. 260-78.00S.
Scholtysik, Gunter, to Sandoz Ltd. Method of treating migraine. 4,046,917, Cl. 424-326.000.
Schonfeld, Steven Edward, to Firestone Tire & Rubber Company, The. Catalysis of amine curable polymers by high dielectric constant compounds. 4,046,743, Cl. 260-77.5AB.
Schoonman, Willem, to Lummus Company, The. Control of freezing in air-cooled steam condensers. 4,045,961, Cl. 60-686.000.
Schreyer, Gerd: *See*—
Heimberger, Werner; and Schreyer, Gerd, 4,046,862, Cl. 423-383.000.
Schroeder, Charles Martin, Jr., to Western Electric Company, Inc. Methods and apparatus for stripping optical fiber ribbons. 4,046,298, Cl. 225-2.000.
Schromm, Kurt: *See*—
Mentrup, Anton; Schromm, Kurt; Renth, Ernst-Otto; and Traunecker, Werner, 4,046,913, Cl. 424-311.000.
Schulze, Reinhold, to Norddeutsche Affinerie. Process for the adsorptive removal of arsenic, antimony and/or bismuth from an aqueous solution. 4,046,687, Cl. 210-32.000.
Schwartz, Norman; and Mohrbacher, Richard J., to McNeil Laboratories, Incorporated. 2,3-Diphenyl-5-ethylpyrazine. 4,046,763, Cl. 260-250.00B.
Schwartz, Robert B.: *See*—
Chieger, George; Schwartz, Robert B.; and Banerjea, Tara N., 4,046,278, Cl. 220-1.500.
Schwartz, Robert S.; and Pfister, Ronald R., to American Hospital Supply Corporation. Medical instrument for locating and removing occlusive objects. 4,046,150, Cl. 128-328.000.
Schwehr, Richard A., to Towmotor Corporation. Pivotally actuated speed control means of an apparatus. 4,047,145, Cl. 338-67.000.
Scientific Micro Systems, Inc.: *See*—
Allison, David F., 4,047,195, Cl. 357-55.000.
Scientific Technology Inc.: *See*—
Key, Paul Franklyn; and Lazzara, Anthony Ross, 4,047,023, Cl. 250-214.00B.
Scott, Eldred D., to Precision Engineered Products, Inc. Socket inserter. 4,045,870, Cl. 29-741.000.
Scott, Paul B., to Xonics, Inc. Solar heater with automatic venting. 4,046,134, Cl. 126-270.000.
Scriven, Roger L.; and Chang, Wen-Hsuan, to PPG Industries, Inc. Water-reduced urethane coating compositions. 4,046,729, Cl. 260-29.2TN.
Sea-Log Corporation: *See*—
Schirtzinger, Joseph F., 4,045,967, Cl. 61-86.000.
Seal Petroleum Limited: *See*—
Darnborough, Eric; and Coulboy, Rene Henri, 4,046,192, Cl. 166-.600.
Seeger, Richard E., Jr., to Chomerics, Inc. Keyboard switch assembly having internal gas passages preformed in spacer member. 4,046,975, Cl. 200-5.00A.
Seeling, Philip F.; and Bean, Samuel L., to Allied Chemical Corporation. Method for making sulfur dioxide-containing gas stream. 4,046,867, Cl. 423-543.000.
Seemayer, Walter: *See*—
Choksi, Pradip Vinobchandra; and Seemayer, Walter, 4,046,145, Cl. 128-215.000.
Sefton, Philip Charles; and Chad, Kenneth Ernest, to Thorn Domestic Appliances (Electrical) Limited. Power control apparatus. 4,046,991, Cl. 219-497.000.
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for the treatment of heavy petroleum oil. 4,046,670, Cl. 208-48.0AA.
Seidelberger, Hartmut: *See*—
Puchelt, Manfred; and Seidelberger, Hartmut, 4,046,632, Cl. 176-87.000.
Seiko Seiki Kabushiki Kaisha: *See*—
Moritomo, Sadao, 4,045,919, Cl. 51-165.770.
Seitz, Max, to Carl Wurth Maschinen- und Zahnradfabrik. Rolling drive on a gear grinding machine. 4,045,916, Cl. 51-123.00G.
Seitz, Max: *See*—
Loos, Herbert; Seitz, Max; and Erhardt, Manfred, 4,045,917, Cl. 51-123.00G.
Sekhar, Neel C., to Upjohn Company, The. Process for treating elevated platelet adhesiveness. 4,046,915, Cl. 424-317.000.
Sekhon, Kalwant S.; Nelson, Lloyd A.; and Fritz, John E., Jr., to Hughes Aircraft Company. Transistor cooling by heat pipes having a wick of dielectric powder. 4,047,198, Cl. 357-82.000.
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Selman, Charles M.; and Uraneck, Carl A., to Phillips Petroleum Company. Preparation of functional polymers. 4,046,745, Cl. 260-77.5CR.
SEMIKRON Gesellschaft fur Gleichrichterbau und Elektronik m.b.H.: *See*—
Schierz, Winfried, 4,047,197, Cl. 357-81.000.
Sevak, Nitin M., to Burroughs Corporation. Document stacking device. 4,046,371, Cl. 271-178.000.
Severino, Frank Titus, to Stauffer Chemical Company. Method for recovering ethylene values. 4,046,822, Cl. 260-659.00A.
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Sextro, Gunter; Burg, Karlheinz; Leugering, Hans Joachim; Schlaf, Helmut; and Heller, Alwin, to Hoechst Aktiengesellschaft. Process for the manufacture of granular oxymethylene polymers. 4,046,738, Cl. 260-67.0FP.
Shaikh, Nisar, to Brunswick Corporation. Exhaust silencer apparatus for internal combustion engine. 4,046,219, Cl. 181-211.000.
Shakley, Conrad Dale: *See*—
Goffredo, Daniel L.; and Shakley, Conrad Dale, 4,046,248, Cl. 198-583.000.
Shanmugasundaram, Venkatachalam, to Walter Kidde & Company, Inc. Telescopic swingaway jib. 4,045,923, Cl. 52-118.000.
Sharp, Russell G.: *See*—
Cooley, Denton A.; Reed, Charles C.; and Sharp, Russell G., 4,045,859, Cl. 29-451.000.
Shaw, Andrew, to Imperial Chemical Industries Limited. 6-Aryl-pyr-

rolo[1,2-a]Imidazole derivatives which possess anti-hypertensive activity. 4,046,898, Cl. 424-263.000.

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Sheller-Globe Corporation: *See*—
Stuermer, Karl, 4,047,113, Cl. 328-2.000.

Shen, Kuo-Cheng, to Canadian Patents and Development Limited. Composition and method for binding lignocellulosic materials. 4,046,585, Cl. 106-123.0LC.

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Shenk, Walter James, to Bell Telephone Laboratories, Incorporated. Lubrication method. 4,046,225, Cl. 184-15.00R.

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Curran, Adrian Charles Ward; and Shepherd, Robin Gerald, 4,046,895, Cl. 424-258.000.

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Ohori, Harumi; and Shibatani, Juichi, 4,046,231, Cl. 188-71.100.

Shields, George B., to PPG Industries, Inc. Method and apparatus for tempering moving glass sheets. 4,046,543, Cl. 65-25.00A.

Shimago, Kozo: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

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Shimazaki, Mamoru: *See*—
Toyama, Masamichi; Takigawa, Tomoshi; Shimazaki, Mamoru; Okajima, Hidekazu; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,465, Cl. 352-175.000.

Shimazu, Shinichi: *See*—
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.

Shimizu, Kuniaki: *See*—
Taira, Hideya; and Shimizu, Kuniaki, 4,047,175, Cl. 343-100.0CS.

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Watanabe, Kazutaka; Shimizu, Misao; and Sugawara, Akihiro, 4,046,959, Cl. 178-68.000.

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Inoue, Nobuyoshi; and Shimizu, Munetaka, 4,047,211, Cl. 354-258.000.

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Sano, Takezo; Shimomura, Takatoshi; and Sasaki, Masao, 4,046,843, Cl. 264-22.000.

Shinagawa Firebrick Co., Ltd.: *See*—
Saito, Shinroku, 4,046,499, Cl. 425-405.00H.

Shinoda, Akira: *See*—
Takaoka, Sabro; Shinoda, Akira; and Kobayashi, Hideo, 4,046,204, Cl. 175-76.000.

Shinoda, Nobuhiko: *See*—
Mashimo, Yukio; Sakurada, Nobuaki; Ito, Tadashi; Ito, Fumio; and Shinoda, Nobuhiko, 4,047,187, Cl. 354-23.00D.

Shinoda, Yoshio: *See*—
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,046,998, Cl. 235-150.210.

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Ando, Yujiro; Ohara, Katsunobu; and Shinohara, Yukimasa, 4,046,466, Cl. 355-3.00R.

Shipchandler, Mohammed T., to IMC Chemical Group, Inc. Method of synthesis of pyrogallol. 4,046,817, Cl. 260-621.00R.

Shoemaker, Philip D.; and McQueary, Hobert O., to Ellingson Timber Co. Manufacture of overlayed product with phenol-formaldehyde barrier for polyisocyanate binder. 4,046,952, Cl. 428-423.000.

Shoffa, Vadim Nikolaevich: *See*—
Smirnov, Vladimir Alexeevich; and Shoffa, Vadim Nikolaevich, 4,047,237, Cl. 361-210.000.

Shoupe, J. T.: *See*—
Frank, Thomas E.; Gum, Roy E.; Shoupe, J. T.; and Warner, Dennis L., 4,046,469, Cl. 355-13.000.

Showalter, Lane Crawford; Brokenshire, John Leslie; and Watts, Geoffrey B., to Marsland Engineering Limited. Air curtain device. 4,045,997, Cl. 73-23.000.

Shutt, Donald P., to Western Gear Corporation. Automatic load brake. 4,046,235, Cl. 188-134.000.

Sich, Edward: *See*—
Klees, Gerard T.; Meacham, Robert A.; Ruby, Harry M.; and Sich, Edward, 4,046,415, Cl. 296-35.00R.

Sieg, Robert P.: *See*—
Kemp, Jacob D.; and Sieg, Robert P., 4,046,520, Cl. 44-56.000.

Siemens Aktiengesellschaft: *See*—
Aleite, Werner; and Bock, Heinz-Wilhelm, 4,046,624, Cl. 176-22.000.
Andrascek, Ernst; and Hadersbeck, Hans, 4,046,620, Cl. 156-666.000.
Deserno, Ulrich; and Auracher, Franz, 4,046,537, Cl. 65-2.000.
Fiebelkorn, Klaus Dieter; and Spitzer, Gunther, 4,046,453, Cl. 350-96.00C.
Hartmann, Gunter; and Winckler, Rudolf, 4,045,869, Cl. 29-630.00A.
Hertz, Walter; Stroh, Jan; and Mentel, Jurgen, 4,046,979, Cl. 200-148.00A.
Koubek, Michael; and Mallon, Dietmar, 4,047,052, Cl. 307-228.000.
Koubek, Michael, 4,047,200, Cl. 358-47.000.
Laurent, Estan, 4,047,050, Cl. 307-108.000.
Liska, Manfred, 4,047,081, Cl. 318-138.000.
Losehand, Helmut, 4,046,971, Cl. 179-90.00K.
Meyer, Rudolf, 4,047,043, Cl. 250-401.000.
Mitterhummer, Gerhard; Peltz, Hanns-Heinz; Mayer, Heinrich; and Conzelmann, Fritz, 4,045,863, Cl. 29-588.000.
Pieverling, Klaus V., 4,047,176, Cl. 343-106.00R.
Reier, Richard; and Kuelzer, Peter, 4,046,303, Cl. 228-173.000.
Veith, Werner, 4,047,077, Cl. 315-169.0TV.
Wolf, Gerhard, 4,047,160, Cl. 364-900.000.

Sigismondo Piva S.p.A.: *See*—
Manetti, Orlando, 4,046,087, Cl. 112-121.150.

Silver, Stanley Milton, to Paxall, Inc. Packaging. 4,046,308, Cl. 229-17.00R.

Silverberg, Morton: *See*—
Eichorn, Roger H., deceased; Silverberg, Morton; and Mandrino, Russell J., executor, 4,046,472, Cl. 355-14.000.

Simekus, Inc.: *See*—
Robinson, Myron L., 4,047,100, Cl. 324-30.00B.

Simmons, Harry M.: *See*—
Root, Ernest F.; Kunica, Serge; and Simmons, Harry M., 4,046,135, Cl. 126-271.000.

Simpson, Barry: *See*—
Hosford, Charles D.; and Simpson, Barry, 4,046,084, Cl. 108-112.000.

Sjoquist, Stig Roland: *See*—
Malmberg, Thor Anders Helge; Hogberg, Knut Goran; and Sjoquist, Stig Roland, 4,047,033, Cl. 250-341.000.

SKF Industries, Inc.: *See*—
Kiener, Heinz, 4,046,433, Cl. 308-191.000.

Skrivanek, Karl; and Janek, Klaus, to Klockner-Humboldt-Deutz Aktiengesellschaft. Pressure system for a transmission, especially for an auxiliary gearbox for driving auxiliary devices in aircraft. 4,046,222, Cl. 184-6.110.

Sloane, Edwin A.; McKeever, Bruce T.; and Wong, Eugene, to Time/-Data Corporation. Laplace transform system. 4,047,002, Cl. 235-151.300.

Smirnov, Vladimir Alexeevich; and Shoffa, Vadim Nikolaevich. Means for controlling electromagnetic device having hermetically sealed contacts. 4,047,237, Cl. 361-210.000.

Smith, David F. Type of adhesive cement and certain improved products made possible thereby. 4,046,578, Cl. 106-35.000.

Smith, Donald Edward, to Procter & Gamble Company, The. Dermatological compositions. 4,046,886, Cl. 424-227.000.

Smith International, Inc.: *See*—
Liljestrand, Walter E., 4,046,528, Cl. 55-160.000.

Smith, James D. B.; and Phillips, David C., to Westinghouse Electric Corporation. Sulfonic acid composition for forming thermoparticulating coating. 4,046,733, Cl. 260-33.6EP.

Smith, James D. B.; and Phillips, David C., to Westinghouse Electric Corporation. Malonic acid derivative composition for forming thermoparticulating coating. 4,046,943, Cl. 428-339.000.

Smith, James Edwin: *See*—
Cloud, Nathan; and Smith, James Edwin, 4,046,328, Cl. 242-18.00A.

Smith, James Nelson: *See*—
Goodner, Willis Ray; Smith, James Nelson; and Horvath, John, 4,046,820, Cl. 260-652.50R.

Smith, Kenneth Browning; and Adams, Derek William, to Heath (Gloucester) Ltd. Strip profile measurement. 4,047,036, Cl. 250-359.000.

Smith Kline & French Laboratories Limited: *See*—
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,046,907, Cl. 424-273.00R.

Smith, Malcolm John; Miles, Peter; Richardson, Norman; and Finan, Michael Anthony, to Ciba Geigy (UK) Limited. Treatment of aqueous systems. 4,046,707, Cl. 252-180.000.

Smith, Melvin Dee: *See*—
Johnston, Katharine Gentry; and Smith, Melvin Dee, 4,046,514, Cl. 23-253.0TP.

Smith, Paul W., III. Method and apparatus for reducing vehicle side sway. 4,046,395, Cl. 280-106.50R.

Smith, Ray E., to Velsicol Chemical Corporation. Durable flame retardant finishes for textile materials. 4,046,701, Cl. 252-8.100.

Smith, Royal; and Carson, Edward H. D. Wheelchairs. 4,046,418, Cl. 297-118.000.

Smithen, Carey Ernest: *See*—
Hassall, Cedric Herbert; Johnson, William Henry; Krohn, Antonin; Smithen, Carey Ernest; and Thomas, William Anthony, 4,046,751, Cl. 260-112.50R.

Smithgall, David Harry, Sr., to Western Electric Company, Inc. Monitoring and control of optical fiber diameters. 4,046,536, Cl. 65-2.000.

Smulders, Hendricus Franciscus Gerardus; and Franken, Adrianus Jacobus Jozef, to U.S. Philips Corporation. Centering of lenses. 4,046,458, Cl. 350-178.000.

Smutny, Viktor, to Ruti Machinery Works Ltd. Apparatus for lubricating the gripper band of a shuttleless loom. 4,046,224, Cl. 184-15.00R.

SNAM Progetti S.p.A.: *See—*
Moggi, Pietro Antonio; and Romano, Ugo, 4,046,810, Cl. 260-571.000.

Sneed, John E. Pulling tool. 4,045,856, Cl. 29-262.000.

Snitzer, Elias: *See—*
Uhlmann, Donald R.; Snitzer, Elias; Hovey, Richard J.; Chu, Nori Y. C.; and Fournier, Joseph T., Jr., 4,046,586, Cl. 106-194.000.

Snyder, Edward, III: *See—*
Ensmann, Burt; Nielsen, Edwin A.; Snyder, Edward, III; and Ventura, Frank D., 4,045,908, Cl. 46-204.000.

Snyder, Paul F.: *See—*
Snyder, Raymond C.; and Snyder, Paul F., 4,046,584, Cl. 106-90.000.

Snyder, Raymond C.; and Snyder, Paul F. Liquid concrete accelerating mixtures and methods for use thereof. 4,046,584, Cl. 106-90.000.

Snyder, Robert S.: *See—*
United States of America, National Aeronautics and Space Administration; Walter, Hans U.; and Snyder, Robert S., 4,046,617, Cl. 156-601.000.

Societa' Farmaceutici Italia S.p.A.: *See—*
Patelli, Bianca; Bernardi, Luigi; Arcamone, Federico; and Di Marco, Aurelio, 4,046,878, Cl. 424-180.000.

Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See—*
Juillard, Yves; and Riner, Victor, 4,046,170, Cl. 139-20.000.

Societe Anonyme Cortial S.A.: *See—*
Negrevergne, Georges, 4,046,916, Cl. 424-319.000.

Societe Anonyme de Telecommunications: *See—*
Le Gall, Jean C., 4,046,176, Cl. 140-92.100.

Societe Industrielle Bertrand Faure: *See—*
de la Taille, Olivier; Bernard, Armand; and Labadie, Jean-Francois, 4,046,420, Cl. 297-216.000.

Societe Industrielle de Brevets et d'Etudes S.I.B.E.: *See—*
Pierlot, Michel E., 4,046,121, Cl. 123-139.0AW.

Societe Metallurgique de Revigny: *See—*
Mandras, Christian Maurice, 4,045,837, Cl. 15-104.040.

Societe Nationale des Poudres et Explosifs: *See—*
Loeb, Jean; and Plantif, Bernard E., 4,045,830, Cl. 5-81.00R.

Soga, Yasuyuki, to Dijet Industrial Co, Ltd. Cemented carbide material for cutting operation. 4,046,517, Cl. 539.5-.

Sogi, Toshiyuki: *See—*
Takahashi, Hidenori; Tamura, Hiroshi; Watanabe, Shigeo; and Sogi, Toshiyuki, 4,046,183, Cl. 152-362.00R.

Solartron Electronic Group Limited, The: *See—*
Dorey, Howard Anthony; and Cooke, Robert John, 4,047,162, Cl. 364-200.000.
Ley, Anthony John; and Metcalf, Eric, 4,047,053, Cl. 307-238.000.

Solitron Devices, Inc.: *See—*
Nordstrom, Donald B., 4,046,052, Cl. 85-61.000.

Sonntag, Guenther: *See—*
Finkemeyer, Karl-Friedrich; Roehr, Kuno M.; and Sonntag, Guenther, 4,047,244, Cl. 364-200.000.

Sony Corporation: *See—*
Hisagen, Yoshiaki; and Hoshi, Kazuo, 4,047,232, Cl. 360-134.000.
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,047,089, Cl. 363-49.000.

Sopcak, James E.; and Rowland, Walter, to Continental Group, Inc., The. Test fixture for leak detectors. 4,045,996, Cl. 73-1.00R.

Sorg GmbH & Co. KG: *See—*
Pieper, Helmut, 4,046,547, Cl. 65-135.000.

Soucy, Frank: *See—*
Cosco, Robert J.; Lima, Joseph V.; and Soucy, Frank, 4,047,064, Cl. 313-201.000.

Souza, Anthony J., to Woodstream Corporation. Animal trap. 4,045,905, Cl. 43-88.000.

Spangler, Perry Kay, to Olin Corporation. Fusee cap closure. 4,046,075, Cl. 102-37.800.

Sparber, Richard Grant, to Bell Telephone Laboratories, Incorporated. Ohmmeter for circuits carrying unknown currents. 4,047,104, Cl. 324-62.000.

Sparks, Charles H., to Steel Structures, Inc. Fluid-mechanical drive for press brake. 4,045,995, Cl. 72-450.000.

Spaziante, Placido M.: *See—*
de Nora, Oronzio; de Nora, Vittorio; and Spaziante, Placido M., 4,046,653, Cl. 204-95.000.

Spence, Henry L.: *See—*
White, Thomas J.; Spence, Henry L.; and McClelland, Etheridge R., 4,045,940, Cl. 53-26.000.

Spencer Foods, Inc.: *See—*
Pearson, Gerald L.; and Tuma, Harold J., 4,046,046, Cl. 83-745.000.

Spencer, Rodney S.: *See—*
Rice, Stephen H.; Spencer, Rodney S.; and Fleetwood, Charles M., Jr., 4,046,619, Cl. 156-645.000.

Speranza, George P.: *See—*
Austin, Thomas H.; and Speranza, George P., 4,046,721, Cl. 260-2.5AW.

Sperry Rand Corporation: *See—*
Mast, Aquila D., 4,045,947, Cl. 56-343.000.
Phillips, Edwin R.; and Stankiewicz, Raymond J., 4,047,185, Cl. 346-140.00R.

Spillers, Milton L. Board holding device. 4,046,362, Cl. 269-43.000.

Spitzer, Gunther: *See—*
Fiebelkorn, Klaus Dieter; and Spitzer, Gunther, 4,046,453, Cl. 350-96.00C.

Spiva, Stephan D.: *See—*
Harvey, Leslie E.; and Spiva, Stephan D., 4,046,376, Cl. 273-54.00D.

Spound, Albert M.; and Day, Robert C., to Charlton Company, Inc. Modular article of furniture. 4,046,421, Cl. 297-232.000.

Springer, Hartmut: *See—*
Meininger, Fritz; and Springer, Hartmut, 4,046,754, Cl. 260-162.000.

Sprinter Pack AB: *See—*
Gustafsson, Nils-Ake, 4,046,310, Cl. 229-30.000.

Sridhar, Srinivasan; and Hedden, Horst, to Chemische Werke Huls Aktiengesellschaft. Method for extracting granular polyamides and for preparing polyamide powders. 4,046,746, Cl. 260-78.00S.

Stabile, James, to Union Carbide Corporation. Pipettor apparatus. 4,046,511, Cl. 23-259.000.

Stacey, Eric J.: *See—*
Gyugyi, Laszlo; Stacey, Eric J.; and Brennen, Michael B., 4,047,097, Cl. 323-119.000.

Stach, Leonard J., to Velsicol Chemical Corporation. N-(α-Aminoalkylidene)phosphor- and phosphonamidates, and method for controlling insects. 4,046,884, Cl. 424-210.000.

Stal-Laval Turbin AB: *See—*
Brannstrom, Roine; and Nilsson, Goran, 4,045,955, Cl. 60-39.28R.
Mansson, Martin, 4,046,155, Cl. 134-167.00R.

Stalego, Charles J., to Owens-Corning Fiberglas Corporation. Glass melter having reflective top wall and method for using same. 4,046,535, Cl. 65-1.000.

Stallberg, Gunnel Anna Maria: *See—*
Haligren, Bo Erik; and Stallberg, Gunnel Anna Maria, 4,046,914, Cl. 424-312.000.

Stanaback, Robert J.; and Reale, Michael J., to Tenneco Chemicals, Inc. Flame-retardant resinous compositions containing trihaloneopentyl haloalkyl phosphates. 4,046,719, Cl. 260-2.5FP.

Stanadyne, Inc.: *See—*
Salzgeber, Daniel Edwin; Raufeisen, Robert; and Davis, Charles W., 4,046,494, Cl. 417-253.000.

Stancliffe, Floyd S. Landing gear for an aircraft including expansible wheels. 4,046,339, Cl. 244-103.00R.

Standard Oil Company, The: *See—*
Hardman, Harley F., 4,046,833, Cl. 260-683.300.

Standard Oil Company (Indiana): *See—*
Puskas, Imre; and Fields, Ellis K., 4,046,779, Cl. 260-346.220.

Standard Technology, Inc.: *See—*
Hayashi, Osamu; Inagaki, Takahumi; and Yanagita, Yoshio, 4,046,158, Cl. 137-88.000.

Stankiewicz, Raymond J.: *See—*
Phillips, Edwin R.; and Stankiewicz, Raymond J., 4,047,185, Cl. 346-140.00R.

Stanley, Edward B., to United States Steel Corporation. Process for producing nonoriented silicon sheet steel having excellent magnetic properties in the rolling direction. 4,046,602, Cl. 148-111.000.

Stanley, Philip E.; Woods, William E.; and Izbicki, Kenneth J., to Honeywell Information Systems Inc. Address formation in a microprogrammed data processing system. 4,047,247, Cl. 364-200.000.

Stanley Works, The: *See—*
Catlett, John C., 4,045,914, Cl. 49-334.000.

Stanwell-Smith, Colin Howard: *See—*
Gosling, Alexander Bennett; Ridler, Keith Douglas; Easthope, Frederick James; and Stanwell-Smith, Colin Howard, 4,046,386, Cl. 274-23.00A.

Stark, Marvin: *See—*
Tedesco, George A.; and Stark, Marvin, 4,046,082, Cl. 105-377.000.

Starks, Charles M.: *See—*
Gordon, Ronnie D.; and Starks, Charles M., 4,046,823, Cl. 260-662.00R.

Staroselsky, Naum: *See—*
Rutshtein, Alexander; and Staroselsky, Naum, 4,046,490, Cl. 417-28.000.

Start, John F.: *See—*
Fekete, Thomas M.; and Start, John F., 4,046,857, Cl. 423-300.000.

Stauffer Chemical Company: *See—*
Hurlburt, Harvey Zeh; and Sumner, Clark A., 4,046,866, Cl. 423-533.000.
Scher, Herbert B., 4,046,741, Cl. 260-77.50A.
Severino, Frank Titus, 4,046,822, Cl. 260-659.00A.
Walsh, Edward N., 4,046,885, Cl. 424-210.000.

Steel Structures, Inc.: *See—*
Sparks, Charles H., 4,045,995, Cl. 72-450.000.

Stefanik, John E., to PPG Industries, Inc. Laminated window structure and its method of fabrication. 4,046,933, Cl. 428-81.000.

Stefanik, John E., to PPG Industries, Inc. Laminated transparent assembly with edge sealing means. 4,046,951, Cl. 428-412.000.

Steffen, Sylvester L. Ventilation process for inducing biochemical reactions in stored food grain while preserving dormancy. 4,045,878, Cl. 34-26.000.

Steffen, Sylvester L. Solar grain drying apparatus. 4,045,880, Cl. 34-93.000.

Steidley, John W.: *See—*
Schlosser, Philip A.; and Steidley, John W., 4,047,037, Cl. 250-370.000.

Steigerwald, Robert L., to General Electric Company. Power inductor and transformer with low acoustic noise air gap. 4,047,138, Cl. 336-100.000.

Stein, Thomas R.: *See*—
Ireland, Henry R.; and Stein, Thomas R., 4,046,829, Cl. 260-676.00R.
Steiner, Edward L.: *See*—
Laskowski, Kenneth W.; and Steiner, Edward L., 4,046,467, Cl. 355-3.00R.
Stenstrom, Lennart Arvid, to Alfa-Laval AB. Apparatus for weighing a flowing material. 4,046,208, Cl. 177-19.000.
Stephenson, William I., Jr.: *See*—
Maier, Alfred E.; and Stephenson, William I., Jr., 4,047,134, Cl. 335-23.000.
Sterling Drug Inc.: *See*—
Bailey, Denis M., 4,046,775, Cl. 260-326.200.
Stern, Philip. Planetarium with star identifying means. 4,045,885, Cl. 35-42.500.
Sterner, Russell L., to Bucyrus-Erie Company. Telescopic boom with sections of beam and truss construction. 4,045,936, Cl. 52-632.000.
Steury, Thomas Dean: *See*—
Branham, Charles Escom; Steury, Thomas Dean; and Woodward, John Maury, 4,046,471, Cl. 355-14.000.
Stevens, Charles H., to International Telephone and Telegraph Corporation. Wire splitter for round conductor flat ribbon cable. 4,046,045, Cl. 83-620.000.
Stevens Engineering: *See*—
Coope, Robert L.; and Munson, Lowell W., 4,046,364, Cl. 269-244.000.
Stievenart, Emile Frans; Plessers, Hendrik Sylvester; Neujens, Georges Jozef; and Van Bouwel, Leo Pa ul, to AGFA-GEVAERT N.V. Apparatus for opening radiographic cassettes. 4,047,193, Cl. 354-105.000.
Stith, Morris Randall, Jr. Apparatus for positioning and supporting a machine. 4,046,354, Cl. 254-93.00R.
Stokes, Richard F., to Garrett Corporation, The. Four-way clevis valve and method. 4,046,061, Cl. 91-459.000.
Stolzer, Paul, to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co Kommanditgesellschaft. Clamping and feeding device for cold saws. 4,046,041, Cl. 83-210.000.
Stone, Dale Eugene: *See*—
Daugherty, Thomas Henry; and Stone, Dale Eugene, 4,046,964, Cl. 179-15.0BF.
Stone, Jerry Lloyd: *See*—
Charamella, John Barrie; Long, John Warren; and Stone, Jerry Lloyd, 4,046,476, Cl. 355-77.000.
Stork Amsterdam B.V.: *See*—
Witte, Johan Frederik, 4,045,879, Cl. 34-31.000.
Strathearn Audio Limited: *See*—
Gosling, Alexander Bennett; Ridler, Keith Douglas; Easthope, Frederick James; and Stanwell-Smith, Colin Howard, 4,046,386, Cl. 274-23.00A.
Straub, Robert D.: *See*—
Knape, Richard S.; and Straub, Robert D., 4,046,322, Cl. 239-533.700.
Stridde, George E., to N L Industries, Inc. Process for alkylating aromatic hydrocarbons with synthetic hectorite-type clay catalyst. 4,046,826, Cl. 260-671.00C.
Stringa, Luigi: *See*—
Giuliao, Ercole; Paita, Orazio; and Stringa, Luigi, 4,047,152, Cl. 340-146.3AG.
Stringer, James L.: *See*—
Day, Clifford K.; and Stringer, James L., 4,047,103, Cl. 324-34.00D.
Stringer, Robert Kenneth; and Johnston, Kenneth Alan, to Commonwealth Scientific and Industrial Research Organization. Ceramic oxygen probe. 4,046,661, Cl. 204-195.00S.
Stroh, Jan: *See*—
Hertz, Walter; Stroh, Jan; and Mentel, Jurgen, 4,046,979, Cl. 200-148.00A.
Strom, Arne Gudmund, to Telefonaktiebolaget L M Ericsson. Method for encapsulating electrical components. 4,045,867, Cl. 29-628.000.
Stroot, Jerome H. Humerus prosthesis. 4,045,825, Cl. 3-1.910.
Stroot, Jerome H. Glenoid component for shoulder prosthesis. 4,045,826, Cl. 3-1.910.
Strupczewski, Joseph T.: *See*—
Helsley, Grover C.; Strupczewski, Joseph T.; and Gardner, Beth Ann, 4,046,900, Cl. 424-267.000.
Stryjewski, Walter A., to Eastman Kodak Company. Method and apparatus for cleaning fusing members of electrographic copiers. 4,046,468, Cl. 355-3.00R.
Stuckert, Paul Edward, to International Business Machines Corporation. Cylindrical, linear, stopless mercury switch and relay. 4,047,135, Cl. 335-58.000.
Stucky, Fritz Christoph, to Credelca A.G. Method of constructing a prefabricated room element and a building of a plurality of said elements. 4,045,937, Cl. 52-745.000.
Studenick, David K., to United States of America, National Aeronautics and Space Administration. Fluid sampling device. 4,046,012, Cl. 73-421.50R.
Stuermer, Karl, to Sheller-Globe Corporation. Feedback circuitry for charge digitizer. 4,047,113, Cl. 328-2.000.
Stuhlman, Frank. Flow coat head for curtain coating machines. 4,046,104, Cl. 118-300.000.
Subramanian, Kohur Nagaraja; and Glaum, Gerald Vernon, to International Nickel Company, Inc., The. Two stage sulfuric acid leaching of sea nodules. 4,046,851, Cl. 423-41.000.
Suess, Frederick F.: *See*—
Hofmann, Charles J.; and Suess, Frederick F., 4,046,432, Cl. 308-189.00R.
Sugawara, Akihiro: *See*—
Watanabe, Kazutaka; Shimizu, Misao; and Sugawara, Akihiro, 4,046,959, Cl. 178-68.000.
Sugden, Kenneth B., to Sundstrand Corporation. Hydromechanical transmission. 4,046,029, Cl. 74-687.000.
Sugino, Masahiro: *See*—
Kato, Yasuo; Kato, Katsuhiko; Sugino, Masahiro; Ikegami, Jun; and Harukawa, Junichi, 4,046,724, Cl. 260-9.000.
Sugita, Minoru: *See*—
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,046,670, Cl. 208-48.0AA.
Sugiyama, Shigeo: *See*—
Kume, Tsutomu; Kasai, Kazuo; Kaneko, Hidefumi; Sugiyama, Shigeo; and Mithuhashi, Shigeo, 4,047,230, Cl. 360-17.000.
Sumita, Isao, to Matsushita Electric Industrial Co., Ltd. High polymer electret. 4,046,704, Cl. 252-63.200.
Sumitomo Aluminum Smelting Co., Ltd.: *See*—
Hirasawa, Kazuhiko; and Okamoto, Yasuo, 4,046,650, Cl. 204-67.000.
Sumitomo Chemical Company, Limited: *See*—
Itoh, Iko; Inoue, Yasuhiko; Ito, Shojiro; and Kawamura, Kazumitsu, 4,046,727, Cl. 260-28.50R.
Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, 4,046,850, Cl. 264-216.000.
Sano, Takezo; Shimomura, Takatoshi; and Sasaki, Masao, 4,046,843, Cl. 264-22.000.
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.
Summerlin, Frederick Arthur: *See*—
Alvi, Zia Raheem; Bradley, William David; Denham, Keith; and Summerlin, Frederick Arthur, 4,046,053, Cl. 85-72.000.
Sumner, Clark A.: *See*—
Hurlburt, Harvey Zeh; and Sumner, Clark A., 4,046,866, Cl. 423-533.000.
Sun Chemical Corporation: *See*—
Horwitt, Laurence G., 4,045,865, Cl. 29-611.000.
Sun Oil Company of Pennsylvania: *See*—
Duling, Irl N.; and Gates, David S., 4,046,703, Cl. 252-59.000.
Sun, Paul L. F., to Kent Feeds, Inc. Production of alfalfa seeds. 4,045,912, Cl. 47-58.000.
Sundberg, Carl-Erik Wilhelm: *See*—
Rydbeck, Nils R. C.; and Sundberg, Carl-Erik Wilhelm, 4,047,151, Cl. 340-146.1AX.
Sundermann, Rudolf: *See*—
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,046,796, Cl. 260-453.00P.
Sundstrand Corporation: *See*—
Sugden, Kenneth B., 4,046,029, Cl. 74-687.000.
Sunnen Products Company: *See*—
Rutter, Harold T., 4,045,877, Cl. 33-178.00R.
Supp, Emil: *See*—
Cornelius, Gerhard; Marschner, Friedemann; Supp, Emil; and Varlam, Toma, 4,045,960, Cl. 60-648.000.
Surfglas, Inc.: *See*—
Prindle, Geoffrey C.; and Santley, J. Sterling, 4,046,093, Cl. 114-165.000.
Surgical Microsystems, Inc.: *See*—
La Russa, Joseph A.; and Troutman, Richard C., 4,046,463, Cl. 351-13.000.
Sutherland, John W. Troweling machine. 4,046,483, Cl. 404-112.000.
Sutton, David J.: *See*—
Nelson, Lorne W.; and Sutton, David J., 4,046,531, Cl. 62-202.000.
Suzuki, Hideaki: *See*—
Tada, Sugihiko; Nakai, Setsuo; Irie, Kazuo; Saito, Hirokazu; and Suzuki, Hideaki, 4,046,154, Cl. 134-65.000.
Suzuki, Kunihiko, to Nissan Motor Co., Ltd. Final drive unit. 4,046,030, Cl. 74-710.000.
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Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, to Sony Corporation. Starting circuit for inverter. 4,047,089, Cl. 363-49.000.
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Hashimoto, Masanao; and Suzuki, Takaaki, 4,046,033, Cl. 74-869.000.
Suzuki, Yoshikazu, to Agency of Industrial Science & Technology. Method for manufacture of aluminum sheet and sintered high-density aluminum laminate by direct powder rolling process. 4,045,857, Cl. 29-420.000.
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Hansson, Bengt; and Svensson, Sigfrid, 4,045,963, Cl. 61-.500.
Sveska Hymas Aktiebolag: *See*—
Hammarstrand, Sten Ove, 4,046,026, Cl. 74-519.000.
Swartzfager, John G. Glass cutting method. 4,046,299, Cl. 225-3.000.
Swetly, Peter, to Boehringer Ingelheim GmbH. Antiviral compositions. 4,046,879, Cl. 424-180.000.
Swier, Willem: *See*—
Di Maio, Anthony E.; and Swier, Willem, 4,045,994, Cl. 72-391.000.
Swiss Aluminium Ltd.: *See*—
Sauer, Charles A., 4,046,009, Cl. 73-359.00R.
Swithenbank, Colin: *See*—
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,046,798, Cl. 260-465.00D.

SWS Silicones Corporation: *See*—
Martin, Eugene Ray, 4,046,795, Cl. 260-448.20E.

Sycor, Inc.: *See*—
Velazquez, Juan F., 4,046,244, Cl. 197-1.00R.

Sydney Hospital: *See*—
Palmer, Alexander Allan, 4,045,999, Cl. 73-59.000.

Syntex (U.S.A.) Inc.: *See*—
Kluge, Arthur F.; Untch, Karl G.; and Fried, John H., 4,046,801, Cl. 560-121.000.
White, Abraham; and Burton, Pamela M., 4,046,877, Cl. 424-177.000.

Systron-Donner Corporation: *See*—
Cook, Kenneth C., 4,046,156, Cl. 137-68.00A.

Syva Company: *See*—
Ullman, Edwin F.; and Rubenstein, Kenneth E., 4,046,636, Cl. 195-63.000.

Szente, Andre, to Hoffmann-La Roche Inc. Benzodiazepine derivatives. 4,046,890, Cl. 424-244.000.

Szigeti nee Haranghy, Terez: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Szilagyi, Gyula: *See*—
Andriska, Viktor; Gorog nee Privitzer, Katalin; Bruckner, Gyorgyi; Nemessanyi nee Szekely, Zsuzsanna; Havasi, Miklos; Raskay, Bela; Grega nee Toth, Erzsebet; Szigeti nee Haranghy, Terez; Dudas, Jozsef; Szilagyi, Gyula; Marosvolgyi, Sandor; Gribovszky, Pal; Pinter, Zoltan; and Bors, Gyozo, 4,046,773, Cl. 548-339.000.

Szvoboda, Janos: *See*—
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,046,765, Cl. 260-288.0CE.

T.I. Superform: *See*—
Laycock, David Brian; and Barnes, Anthony John, 4,045,986, Cl. 72-60.000.

Tabata, Sanetoshi; and Takeuchi, Toshiaki, to Teikoku Piston Ring Co., Ltd. Process for producing metal composite material. 4,046,304, Cl. 228-187.000.

Tacchi, Kenneth J.: *See*—
Bessler, Donald U.; and Tacchi, Kenneth J., 4,046,521, Cl. 44-62.000.

Tada, Sugihiko; Nakai, Setsuo; Irie, Kazuo; Saito, Hirokazu; and Suzuki, Hideaki, to Fuji Photo Film Co., Ltd. Apparatus for continuously removing film coating materials from film. 4,046,154, Cl. 134-65.000.

Tafoya, Vincent G., to Union Oil Company of California. Steam injection apparatus and method. 4,046,199, Cl. 166-303.000.

Tagaya, Kiyoshi: *See*—
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,046,670, Cl. 208-48.0AA.

Taguchi, Tetsuya: *See*—
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, 4,047,194, Cl. 354-149.000.

Taira, Hideya; and Shimizu, Kuniaki, to Tokyo Keiki Company Limited. Television antenna directing and tracking system for television program network between air-borne and ground offices. 4,047,175, Cl. 343-100.0CS.

Takagawa, Masanori: *See*—
Akutsu, Hidezo; Iwama, Katsuaki; Saito, Naoki; Takagawa, Masanori; Kobayashi, Yoshichika; and Atsumi, Tamisuke, 4,047,069, Cl. 313-487.000.

Takahashi, Hidenori; Tamura, Hiroshi; Watanabe, Shigeo; and Sogi, Toshiyuki, to Bridgestone Tire Company Limited. Radial tire having a highly durable bead structure. 4,046,183, Cl. 152-362.00R.

Takahashi, Noriaki: *See*—
Itoo, Hayami; Takahashi, Noriaki; and Kouda, Hiromasa, 4,046,856, Cl. 423-166.000.

Takahashi, Ryohei; Fujikawa, Kanichi; Yokomichi, Isao; Tsujii, Yasuhiro; and Sakashita, Nobuyuki, to Ishihara Sangyo Kaisha, Ltd. Herbicidal compound, herbicidal composition containing the same and method of use thereof. 4,046,553, Cl. 71-94.000.

Takano, Hiroshi: *See*—
Kumada, Akio; Takano, Hiroshi; Eto, Yoshizumi; and Hibi, Masao, 4,046,455, Cl. 350-150.000.

Takaoka, Sabro; Shinoda, Akira; and Kobayashi, Hideo, to Agency of Industrial Science & Technology. Controlled directional drilling tool. 4,046,204, Cl. 175-76.000.

Takechi, Hiroshi; Abe, Mitsunobu; Usuda, Matsuo; and Komiya, Kunihiko, to Nippon Steel Corporation. Vibration damping steel material and process for producing the same. 4,046,597, Cl. 148-12.00R.

Takeda Chemical Industries, Ltd.: *See*—
Kuwada, Yutaka; Tawada, Hiroyuki; and Meguro, Kanji, 4,046,772, Cl. 260-308.00R.

Takemoto, Takashi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Ignition apparatus. 4,046,126, Cl. 123-148.0DS.

Takemoto, Takeshi: *See*—
Kato, Saburo; and Takemoto, Takeshi, 4,046,334, Cl. 242-201.000.

Takeuchi, Toshiaki: *See*—
Tabata, Sanetoshi; and Takeuchi, Toshiaki, 4,046,304, Cl. 228-187.000.

Takeyama, Fumimasa, to Alps Electric Co., Ltd. Variable resistor assembly. 4,047,146, Cl. 338-176.000.

Takigawa, Tomoshi: *See*—
Toyama, Masamichi; Takigawa, Tomoshi; Shimazaki, Mamoru; Okajima, Hidekazu; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,465, Cl. 352-175.000.

Takino, Masuichi; Kurosaki, Teikichi; and Odaka, Munehiko, to Nippon Zoki Pharmaceutical Co., Ltd. Trioxopteridine derivatives suitable as medicament. 4,046,893, Cl. 424-251.000.

Tallon, James I., to McNeil Corporation. Display stand. 4,046,260, Cl. 211-24.000.

Tally, Joseph O., Jr. Combined lighthouse and wind direction indicator. 4,046,007, Cl. 73-188.000.

Tamao, Yoshikuni: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.

Tamura, Hiroshi: *See*—
Takahashi, Hidenori; Tamura, Hiroshi; Watanabe, Shigeo; and Sogi, Toshiyuki, 4,046,183, Cl. 152-362.00R.

Tan, Hong Sheng: *See*—
Verweij, Jan; and Tan, Hong Sheng, 4,046,761, Cl. 544-17.000.

Tanaka, Daiichiro: *See*—
Saito, Toranosuke; Kohno, Jujiro; Tanaka, Daiichiro; and Oda, Shinichi, 4,046,941, Cl. 428-323.000.

Tanaka, Hiroshi: *See*—
Saitoh, Kozo; Tanaka, Hiroshi; Nagahama, Tatsuya; and Izumi, Sumio, 4,046,677, Cl. 209-166.000.

Tanaka, Kazuo: *See*—
Okuda, Naoki; and Tanaka, Kazuo, 4,046,988, Cl. 219-137.00R.

Tanaka, Kojiro, to Kabushiki Kaisha Daini Seikosha. Digital electronic timepiece. 4,045,951, Cl. 58-23.00R.

Tanaka, Mizuo: *See*—
Yamagishi, Hidehisa; and Tanaka, Mizuo, 4,046,604, Cl. 148-156.000.

Tangler, James L., to Textron, Inc. Vortex diffusion and dissipation. 4,046,336, Cl. 244-198.000.

Tanguy, Pierre, to Etud. Method for pancake cooking. 4,046,924, Cl. 426-502.000.

Tanno, Norihiko: *See*—
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

Tarakci, Umit: *See*—
Lim, Teong C.; Tarakci, Umit; and Vasile, Carmine F., 4,047,130, Cl. 333-72.000.

Tarnoff, Sherwin S.: *See*—
Adlon, Bruce E.; Villiers, Walter H.; and Tarnoff, Sherwin S., 4,045,896, Cl. 40-106.100.

Tarui, Yasuo; Sakamoto, Tsunenori; and Komiya, Yoshio, to Agency of Industrial Science & Technology. Solar battery. 4,046,594, Cl. 136-89.0SJ.

Tasch, Al F., Jr.: *See*—
Frye, Robert Charles; Fu, Horng-Sen; and Tasch, Al F., Jr., 4,047,215, Cl. 357-24.000.

Taub, Howard Hyman, to International Business Machines Corporation. Method and apparatus for controlling the formation and shape of droplets in an ink jet stream. 4,047,183, Cl. 346-1.000.

Tawada, Hiroyuki: *See*—
Kuwada, Yutaka; Tawada, Hiroyuki; and Meguro, Kanji, 4,046,772, Cl. 260-308.00R.

Tax, Hans. Crane and method of building the same. 4,045,866, Cl. 29-628.000.

Taylor, Frederick P.: *See*—
Root, Robert S.; Taylor, Frederick P.; and MacKendrick, William J., 4,046,237, Cl. 192-13.00R.

Taylor Industries, Inc.: *See*—
Taylor, Philip W.; and Scheidler, Rollin G., 4,046,957, Cl. 174-72.00A.

Taylor, James Michael Morrison; and Troke, Gene R. Heavy duty dirt bicycle and frame therefor. 4,046,396, Cl. 280-281.00R.

Taylor, Philip W.; and Scheidler, Rollin G., to Taylor Industries, Inc. Pin structure for modular wiring duct and wire holder system. 4,046,957, Cl. 174-72.00A.

Taylor, Thomas Lee. Earth drilling tools. 4,046,207, Cl. 175-391.000.

TDK Electronics Co., Ltd.: *See*—
Ishino, Ken; Hashimoto, Yasuo; and Abe, Hiroaki, 4,046,983, Cl. 219-10.55D.

Technicon Instruments Corporation: *See*—
Judge, John F. X.; and Salpeter, Jerome, 4,047,032, Cl. 250-338.000.

Tedesco, George A.; and Stark, Marvin, to Pullman Incorporated. Trough hatch locking device. 4,046,082, Cl. 105-377.000.

Teikoku Piston Ring Co., Ltd.: *See*—
Tabata, Sanetoshi; and Takeuchi, Toshiaki, 4,046,304, Cl. 228-187.000.

Teiling, Carl Torbern, to AGA Aktiebolag. Electromechanical transducer. 4,047,087, Cl. 318-661.000.

Teledyne Industries, Inc.: *See*—
Lenz, Herman N., 4,046,487, Cl. 416-208.000.

Telefonaktiebolaget L M Ericsson: *See*—
Petersson, Jan Ake Sigfrid, 4,046,447, Cl. 339-103.00M.
Strom, Arne Gudmund, 4,045,867, Cl. 29-628.000.

Teletype Corporation: *See*—
LaSpesa, Richard E.; and Purzycki, Alfred Z., 4,046,247, Cl. 197-168.000.

Ollendick, Gary B., 4,047,085, Cl. 318-601.000.

Temple, Victor A. K., to General Electric Company. Radiation sensitive thyristor structure with isolated detector. 4,047,219, Cl. 357-38.000.

Tenneco Chemicals, Inc.: *See—*
Stanaback, Robert J.; and Reale, Michael J., 4,046,719, Cl. 260-2.5FP.

Tepper, Edward H.: *See—*
United States of America, National Aeronautics and Space Administration; and Tepper, Edward H., 4,046,529, Cl. 55-179.000.

Teranishi, Akihiko, to Kabushiki Kaisha Teranishi Denki Seisaku-Sho. Lathering device. 4,046,289, Cl. 222-146.0HE.

Terasaki, Katsuhisa. Means for reducing fatigue from wearing footgear. 4,045,886, Cl. 36-44.000.

Terwilliger, James P.; Gingello, Anthony D.; and Wey, Jong-Shinn, to Eastman Kodak Company. Process for preparing silver halide emulsion using a sulfur-containing ripening agent. 4,046,576, Cl. 96-108.000.

Texaco Development Corporation: *See—*
Austin, Thomas H.; and Speranza, George P., 4,046,721, Cl. 260-2.5AW.
Cavitt, Stanley B., 4,046,783, Cl. 260-348.330.
Gipson, Robert Malone, 4,046,784, Cl. 260-348.290.

Texaco Exploration Canada Ltd.: *See—*
Cram, Phillip J.; and Redford, David A., 4,046,195, Cl. 166-272.000.

Texaco Inc.: *See—*
Arnold, Dan M., 4,047,028, Cl. 250-266.000.
Brown, Alfred; Hager, Stephen F.; Chichakli, Moutaz; and Wu, Ching H., 4,046,196, Cl. 166-273.000.
Dorawala, Tansukhlal G.; and Reinhard, Russell R., 4,046,869, Cl. 423-652.000.

Texas Instruments Incorporated: *See—*
Choate, William Clay; and Bhandarkar, Dileep P., 4,047,163, Cl. 340-173.00R.
Frye, Robert Charles; Fu, Horng-Sen; and Tasch, Al F., Jr., 4,047,215, Cl. 357-24.000.
Johnson, Dudley Bruce; and Hanni, Stephen Leroy, 4,046,981, Cl. 200-159.00B.

Texas Medical Products, Inc.: *See—*
Cooley, Denton A.; Reed, Charles C.; and Sharp, Russell G., 4,045,859, Cl. 29-451.000.

Textron, Inc.: *See—*
Moertel, George B., 4,045,846, Cl. 24-205.16C.
Tangler, James L., 4,046,336, Cl. 244-198.000.

Tezuka, Tohru: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.

Thall, Earle Solomon, to RCA Corporation. Method for assembling a thermally-set getter spring in a CRT. 4,045,849, Cl. 29-25.130.

Thalmann, Peter: *See—*
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,088, Cl. 112-265.000.
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,046,089, Cl. 112-265.000.

Theodore, Frank William: *See—*
Gorin, Everett; Jasulaitis, William A.; Wasson, George E.; and Theodore, Frank William, 4,046,496, Cl. 425-222.000.

Theriault, Roland. Detachable handle for aiding in the manipulation of transport carts. 4,045,842, Cl. 16-114.00R.

Therm-O-Disc, Inc.: *See—*
Holden, Ronald L., 4,047,141, Cl. 337-89.000.

Theurer, Josef; and Brunninger, Manfred, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Track renewal method and apparatus. 4,046,077, Cl. 104-2.000.

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Thirion, Philippe Emmanuel, to International Business Machines Corporation. Statistical data detection method and apparatus. 4,047,153, Cl. 340-146.3AQ.

Thomas, Anthony Francis: *See—*
Loose, Winfield Warren; and Thomas, Anthony Francis, 4,045,843, Cl. 24-16.0PB.

Thomas, David C.: *See—*
Henle, Richard G.; Merkert, Clifton S.; and Thomas, David C., 4,046,023, Cl. 74-242.800.

Thomas, David Whitfield, to Owens-Corning Fiberglas Corporation. Oscillating mechanism and method of and means for promoting motion accuracy of the mechanism in a fiber forming operation. 4,046,538, Cl. 65-4.00A.

Thomas, William Anthony: *See—*
Hassall, Cedric Herbert; Johnson, William Henry; Krohn, Antonin; Smithen, Carey Ernest; and Thomas, William Anthony, 4,046,751, Cl. 260-112.50R.

Thompson, William A., Jr., to Roblin Industries, Inc. Shopping cart. 4,046,394, Cl. 280-33.99B.

Thomson-CSF: *See—*
Dubois, Jean-Claude, 4,046,708, Cl. 252-299.000.

Thorn Domestic Appliances (Electrical) Limited: *See—*
Sefton, Philip Charles; and Chad, Kenneth Ernest, 4,046,991, Cl. 219-497.000.

Thornburrow, Peter Robert, to BP Chemicals Limited. Novel polyester compositions. 4,046,740, Cl. 260-75.00N.

Throckmorton, Peter E.: *See—*
Langer, Heimo J.; Robinson, Kenneth R.; and Throckmorton, Peter E., 4,046,812, Cl. 260-583.00B.

Thyoux, George A., to Durobor S.A. Glass container making machine. 4,046,550, Cl. 65-229.000.

Thyssen Purofe GmbH: *See—*
Lange, Georg, 4,046,555, Cl. 75-35.000.

Ticker, Arthur: *See—*
Preiser, Herman S.; and Ticker, Arthur, 4,046,094, Cl. 114-222.000.

Time/Data Corporation: *See—*
Sloane, Edwin A.; McKeever, Bruce T.; and Wong, Eugene, 4,047,002, Cl. 235-151.300.

Timofeev, Gennady Ivanovich: *See—*
Feinzilber, Mikhail Leibovich; Kuzin, Eduard Nikolaevich; Timofeev, Gennady Ivanovich; Roitershtein, Semen Semenovich; Kozlov, Jury Stepanovich; Korelin, Vladimir Fedorovich; Dmitrievsky, Nikolai Vasilievich; Bratyshev, Igor Petrovich; Omelyan, Fedor Evstafievich; Sheinis, Efim Iosifovich; Pak, Vladimir Grigorievich; Romanov, Vladimir Ivanovich; Garbuzov, Zalman Eremeevich; and Naret, Grigory Borisovich, deceased, 4,045,893, Cl. 37-108.00A.

Tinholt, Thomas H., to Eaton Corporation. Viscous driven overrunning clutch. 4,046,239, Cl. 192-58.00B.

Tippmer, Kurt, to Carl Still Recklinghausen, Firma. Method and apparatus for the indirect cooling of hot gases, particularly, coke oven gases. 4,045,970, Cl. 62-95.000.

Tishkov, Anatoly Yakovlevich: *See—*
Kreimer, Vladimir Isakovich; Tishkov, Anatoly Yakovlevich; Grigoriev, Vitaly Markovich; Gendlina, Ljudmila Ivanovna; and Zimonin, Leonid Vasilievich, 4,046,249, Cl. 198-758.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Maeshima, Tsugio; Nishikawa, Eiichiroh; and Nakamura, Mitsuko, 4,046,888, Cl. 423-239.000.

Tobiki, Hisao: *See—*
Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, 4,046,904, Cl. 424-271.000.

Toda, Koichi; Miki, Tetsuya; and Yamaguchi, Haruo, to Anritsu Electric Co., Ltd.; and Nippon Telegraph and Telephone Public Corporation. Sample pulse generating apparatus. 4,047,115, Cl. 328-151.000.

Toft, Kaj; and Busby, Llewellyn D., to General Electric Company. Iron with thermostat mount. 4,045,894, Cl. 38-77.830.

Tokyo Keiki Company Limited: *See—*
Taira, Hideya; and Shimizu, Kuniaki, 4,047,175, Cl. 343-100.0CS.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Ishii, Takashi; Nishida, Katsutoshi; Komatsu, Michiyasu; and Tsuge, Akihiko, 4,046,580, Cl. 106-55.000.
Urui, Kiyoshi, 4,046,966, Cl. 179-18.0BC.

Tokyo Tekko Kabushiki Kaisha: *See—*
Kambara, Kyosaku, 4,046,343, Cl. 248-49.000.

Tomizawa, Kazutaka: *See—*
Kataoka, Shoei; Komaniya, Yasuo; Hashizume, Nobuo; Tomizawa, Kazutaka; and Kawashima, Mitsuo, 4,047,199, Cl. 357-3.000.

Tomkinson, Donald L.: *See—*
Mass, Robert O.; and Tomkinson, Donald L., 4,046,718, Cl. 260-2.00R.

Tomlinson, Alan Digby: *See—*
Johnston, Gordon Francis; Martin, Alexander; and Tomlinson, Alan Digby, 4,046,717, Cl. 252-546.000.

Tonomura, Shinji: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,046,876, Cl. 424-177.000.

Tornqvist, Bengt Wilhelm. Ship's hull. 4,046,092, Cl. 114-56.000.

Torossian, Kevork A.; and Kohn, Leo S., to General Electric Company. Insulating material. 4,046,938, Cl. 428-285.000.

Torres, Jose Marcelo: *See—*
Musick, Charles Ronald; and Torres, Jose Marcelo, 4,046,625, Cl. 176-24.000.

Tortai, Jean-Pierre, to Produits Chimiques Ugine Kuhlmann. Vinyl chloride polymer latexes with two monodisperse modes. 4,046,730, Cl. 260-29.6RB.

Towmotor Corporation: *See—*
Blaisdell, Donald S.; and Walter, Llewellyn L., 4,046,218, Cl. 180-155.000.
Schwehr, Richard A., 4,047,145, Cl. 338-67.000.

Toyama, Masamichi; Takigawa, Tomoshi; Shimazaki, Mamoru; Okajima, Hidekazu; Ichiyanagi, Toshikazu; and Iwama, Hideto, to Canon Kabushiki Kaisha. Self-timer device for motion picture camera. 4,046,465, Cl. 352-175.000.

Toyama, Masamichi: *See—*
Shimazaki, Mamoru; Toyama, Masamichi; Ichiyanagi, Toshikazu; and Iwama, Hideto, 4,046,464, Cl. 352-141.000.

Toyo Boseki Kabushiki Kaisha: *See—*
Kato, Yasuo; Kato, Katsuhiko; Sugino, Masahiro; Ikegami, Jun; and Harukawa, Junichi, 4,046,724, Cl. 260-9.000.

Toyo Sieki Seisakusho Ltd.: *See—*
Maeda, Fumiaki; Naruse, Seiji; and Kamiya, Ko, 4,046,001, Cl. 73-100.000.

Toyobo Co., Ltd.: *See—*
Matsuo, Tatsuki; and Kohata, Teruo, 4,046,525, Cl. 55-59.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Fukuma, Nobuo; and Matsubara, Hideyuki, 4,045,920, Cl. 51-165.880.

Hashimoto, Masanao; and Suzuki, Takaaki, 4,046,033, Cl. 74-869.000.
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,046,998, Cl. 235-150.210.
Nagano, Tetsuro, 4,046,111, Cl. 123-32.0SP.
Ohori, Harumi; and Shibatani, Juichi, 4,046,231, Cl. 188-71.100.

Trainor, John W., to Xerox Corporation. Photoreceptor method and system. 4,046,473, Cl. 355-16.000.

Transequip Inc.: *See—*
Nordstrom, Arnold B., 4,046,186, Cl. 160-368.00R.

Traunecker, Werner: *See—*
Mentrup, Anton; Schromm, Kurt; Renth, Ernst-Otto; and Traunecker, Werner, 4,046,913, Cl. 424-311.000.

Travaglio, Vincent M.: *See—*
Murdoch, Robert N.; Travaglio, Vincent M.; and Magnifico, Michael L., 4,046,083, Cl. 108-107.000.

Travis, Charles W.: *See—*
Jordan, Richard J.; and Travis, Charles W., 4,046,123, Cl. 123-146.50A.

Treese, Willard E.: *See—*
Elco, Richard A.; Bauer, James A.; and Treese, Willard E., 4,046,649, Cl. 204-58.000.

Treier, George, to Xerox Corporation. Carbonless paper for use in electrostatographic copiers. 4,046,404, Cl. 282-27.500.

Tri-State Motor Transit Company: *See—*
Boyd, George F., Sr., 4,046,345, Cl. 248-154.000.

Troke, Gene R.: *See—*
Taylor, James Michael Morrison; and Troke, Gene R., 4,046,396, Cl. 280-281.00R.

Troster, Helmut: *See—*
Otten, Joachim; and Troster, Helmut, 4,046,501, Cl. 8-1.00E.

Troutman, Richard C.: *See—*
La Russa, Joseph A.; and Troutman, Richard C., 4,046,463, Cl. 351-13.000.

Troyer, William J., to Houdaille Industries, Inc. Tuned torsional viscous dampers. 4,046,230, Cl. 188-1.00B.

Trumbly, Terry A.: *See—*
Cormia, Robert L.; Trumbly, Terry A.; and Andresen, Sigurd, 4,046,659, Cl. 204-192.00C.

TRW Inc.: *See—*
Kuonen, Frederick L.; and Boughton, Edward M., 4,046,100, Cl. 118-8.000.

Tsuda, Naotsune: *See—*
Morokuma, Tadashi; and Tsuda, Naotsune, 4,045,864, Cl. 29-603.000.

Tsudakoma Kogyo Kabushiki Kaisha: *See—*
Komatsu, Tokuji, 4,046,099, Cl. 118-6.000.

Tsuge, Akihiko: *See—*
Ishii, Takashi; Nishida, Katsutoshi; Komatsu, Michiyasu; and Tsuge, Akihiko, 4,046,580, Cl. 106-55.000.

Tsujii, Yasuhiro: *See—*
Takahashi, Ryohei; Fujikawa, Kanichi; Yokomichi, Isao; Tsujii, Yasuhiro; and Sakashita, Nobuyuki, 4,046,553, Cl. 71-94.000.

Tsunekawa, Tokuichi: *See—*
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, 4,047,194, Cl. 354-149.000.

Tsunoda, Shogo; Kataoka, Katsuyuki; and Baba, Toshinori, to Ebara Infilco Kabushiki Kaisha. Process for separating suspended metal oxide and metal hydroxide solids from a mother liquor. 4,046,683, Cl. 210-20.000.

Tsunoda, Shogo; and Kataoka, Katsuyuki, to Ebara Infilco Kabushiki Kaisha. Process for the treatment of a colloidal suspension. 4,046,684, Cl 210-20.000.

Tuchyner, Harold J.; and Benson, Robert C., to Hughes Aircraft Company. Multi-level laser illuminator. 4,047,117, Cl. 330-4.300.

Tucker, John W. Duplex basket strainer arrangement. 4,046,695, Cl. 210-340.000.

Tucsok, Steve; and Fogarassy, Elemer. Apparatus for crushing rock, stone and like material. 4,046,325, Cl. 241-73.000.

Tuma, Harold J.: *See—*
Pearson, Gerald L.; and Tuma, Harold J., 4,046,046, Cl. 83-745.000.

Tung, Chung C.: *See—*
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; Baum, Allen J.; Cochran, David S.; and Tung, Chung C., 4,047,012, Cl. 235-156.000.

Tuohino, Lawrence A.: *See—*
D'Alessandro, John A.; and Tuohino, Lawrence A., 4,045,890, Cl. 36-132.000.

Turbo-Lufttechnik GmbH: *See—*
Kolb, Werner Bernard, 4,046,486, Cl. 416-157.00R.

Turner, Sam R., to Xerox Corporation. Electrophotographic imaging members with photoconductive layer containing electron acceptor monomers or polymers. 4,046,564, Cl. 96-1.50R.

Twitchell, F. Shawn, to Construction Systems & Equipment, Inc. Shotcrete accelerator injection apparatus and method. 4,046,357, Cl. 259-147.000.

Tyree, Lewis, Jr. CO_2 Cooling of vehicles. 4,045,972, Cl. 62-156.000.

Uchidoi, Masanori: *See—*
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, 4,047,194, Cl. 354-149.000.

Uchiyama, Takashi: *See—*
Nakamura, Zenzo; Uchiyama, Takashi; Uchidoi, Masanori; Taguchi, Tetsuya; Aizawa, Hiroshi; and Tsunekawa, Tokuichi, 4,047,194, Cl. 354-149.000.

Uddehoms Aktiebolag: *See—*
Janzon, Bo Lennart, 4,046,598, Cl. 148-12.00R.

Uhl, Karl: *See—*
Hartmann, Hans-Joerg; Falk, Roland; Gawlik, Peter; Balz, Werner; Uhl, Karl; Schaefer, Dieter; and Motz, Herbert, 4,046,932, Cl. 428-64.000.

Uhlmann, Donald R.; Snitzer, Elias; Hovey, Richard J.; Chu, Nori Y. C.; and Fournier, Joseph T., Jr., to American Optical Corporation. Stabilized photochromic materials. 4,046,586, Cl. 106-194.000.

Ullman, Edwin F.; and Rubenstein, Kenneth E., to Syva Company. Diazepam enzyme conjugates. 4,046,636, Cl. 195-63.000.

Ullrich, Hansjurgen, to Dr. C. Otto & Comp. G.m.b.H. Process and apparatus for the separation of crude benzol and naphthalene from washing oil. 4,046,641, Cl. 203-39.000.

Ultracentrifuge Nederland N.V.: *See—*
Kistemaker, Jacob, 4,046,527, Cl. 55-100.000.

UMC Industries, Inc.: *See—*
Cox, Robert N.; and Grober, Melvin G., 4,046,440, Cl. 312-215.000.

Under Sea Industries, Inc.: *See—*
Flam, Fred; and Hart, Dennis L., 4,045,835, Cl. 9-313.000.

Underhill, Edward William: *See—*
Huizinga, Donald Dean; Underhill, Edward William; and Whitcomb, James Arthur, 4,046,972, Cl. 179-99.000.

Uniloc, Incorporated: *See—*
Berger, Lawrence A.; and Hunt, Robert Carroll, 4,047,099, Cl. 324-30.00R.

Union Carbide Corporation: *See—*
Anderson, John Erling, 4,046,541, Cl. 65-19.000.
Johnson, Gordon Carlton; and Metzler, Richard Bruce, 4,046,930, Cl. 427-387.000.
Pepe, Enrico J.; and Marsden, James G., 4,046,794, Cl. 260-448.20N.
Stabile, James, 4,046,511, Cl. 23-259.000.

Union Oil Company of California: *See—*
Tafoya, Vincent G., 4,046,199, Cl. 166-303.000.
Young, Dean Arthur, 4,046,674, Cl. 208-251.00H.

Unit Process Assemblies, Inc.: *See—*
Prohaska, Raymond James, 4,046,994, Cl. 235-61.11A.

United Kingdom Atomic Energy Authority: *See—*
Cairns, James Anthony; Nelson, Richard Stuart; and Barnfield, Rhydwyn William, 4,046,712, Cl. 252-447.000.
Clapham, Leslie, 4,046,631, Cl. 176-79.000.
Coast, Geoffrey; and Briody, Ronald Francis, 4,046,630, Cl. 176-39.000.
Durston, John Graham; and Hind, John Richard, 4,046,629, Cl. 176-38.000.
Ellis, John Frederick, 4,046,694, Cl. 210-297.000.

United States Borax & Chemical Corporation: *See—*
Woods, William G.; and Hunter, Don L., 4,046,758, Cl. 260-239.00E.

United States of America
Agriculture: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,046,953, Cl. 428-426.000.
Army: *See—*
Czerwinski, Watson Peter, 4,047,178, Cl. 343-750.000.
Lane, Richard A.; and Fronek, Donald K., 4,047,114, Cl. 328-140.000.
McDanolds, Richard T.; and Jordan, Rodney W., 4,046,055, Cl. 86-1.00B.
Price, Jerome J.; Karsten, Carl G.; and Paggen, William D., 4,046,976, Cl. 200-61.930.
Wohlers, Robert J., 4,047,174, Cl. 343-18.00B.
Energy Research and Development Administration: *See—*
Au, Frederick H. F.; and Beckert, Werner F., 4,046,593, Cl. 134-21.000.
McClanahan, Edwin D.; and Moss, Ronald W., 4,046,666, Cl. 204-298.000.
Pollono, Louis P.; and Mello, Raymond M., 4,046,169, Cl. 138-106.000.
Rodgers, Billy R.; and Edwards, Michael S., 4,046,690, Cl. 210-75.000.
Rosa, Richard J., 4,047,094, Cl. 322-7.000.
Interior: *See—*
Harris, Robert D., 4,046,431, Cl. 308-76.000.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Miller, Charles G.; and Pohl, Jens G. Three-dimensional tracking solar energy concentrator and method for making same. 4,046,462, Cl. 350-295.000.
Tepper, Edward H. Regenerable device for scrubbing breathable air of CO_2 and moisture without special heat exchanger equipment. 4,046,529, Cl. 55-179.000.
Walter, Hans U.; and Snyder, Robert S. Method of crystallization. 4,046,617, Cl. 156-601.000.
National Aeronautics and Space Administration: *See—*
Freche, John C.; and Waters, William J., 4,046,560, Cl. 75-170.000.
Marcus, Bruce D.; and Fleischman, George L., 4,046,190, Cl. 165-105.000.
Moreman, Otis S., III, 4,046,434, Cl. 308-195.000.
Moreman, Otis S., III, 4,046,435, Cl. 308-195.000.
Rice, Stephen H.; Spencer, Rodney S.; and Fleetwood, Charles M., Jr., 4,046,619, Cl. 156-645.000.
Studenick, David K., 4,046,012, Cl. 73-421.50R.

Vykukal, Hubert C.; King, Reginald F.; and Vallotton, Wilbur C., 4,046,262, Cl. 214-1.0CM.

Navy: *See*—
Anderson, Gary L., 4,047,126, Cl. 331-96.000.
Campbell, Kenneth J., 4,047,121, Cl. 331-76.000.
Hagemann, Julius, 4,047,148, Cl. 340-12.00R.
Hampton, Thomas W., 4,046,076, Cl. 102-70.20A.
Hoople, Gary R., 4,047,181, Cl. 343-789.000.
Lord, Harold Wilbur; and Rogers, Jimmy Dale, 4,047,120, Cl. 330-207.00P.
Wilson, Charles A.; and Moran, Patrick J., 4,046,993, Cl. 235-61.50D.

U.S. Philips Corporation: *See*—
Abrahams, Jacobus Hubertus; Collette, Joannes Jacobus Maria; and Walters, Robertus Aloysius Tarcisius Johannes, 4,045,978, Cl. 60-521.000.
Auphan, Michel Joseph, 4,047,034, Cl. 250-354.000.
Bijker, Arnold Jan; and Riemens, Karel, 4,047,108, Cl. 325-38.00B.
Boudry, Michael Robert, 4,047,159, Cl. 364-900.000.
Digoy, Jean-Louis, 4,046,609, Cl. 148-189.000.
Ludikhuize, Adrianus Willem, 4,047,131, Cl. 333-81.00R.
Smulders, Hendricus Franciscus Gerardus; and Franken, Adrianus Jacobus Jozef, 4,046,458, Cl. 350-178.000.

United States Steel Corporation: *See*—
Pringle, William L., 4,045,829, Cl. 5-18.00R.
Rose, Byron W., 4,046,356, Cl. 256-10.000.
Stanley, Edward B., 4,046,602, Cl. 148-111.000.
West, Theodore V., 4,046,038, Cl. 82-47.000.

United Technologies Corporation: *See*—
Armstrong, Lee R.; and Mercik, Henry J., Jr., 4,046,003, Cl. 73-118.000.
Best, Stanley Gordon, 4,046,008, Cl. 73-349.000.
Buono, Dennis F.; Carlson, Nils G.; Hibner, David H.; and Moriniello, Donald C., 4,046,430, Cl. 308-26.000.
DiSabato, Vincent J., 4,045,957, Cl. 60-262.000.
Fanciullo, Salvatore, 4,046,956, Cl. 429-20.000.
Markowski, Stanley J.; and Nolan, James J., 4,045,956, Cl. 60-39.650.

Universal Oil Products Company: *See*—
Wilhelm, Frederick C., 4,046,715, Cl. 252-466.00B.

University of Utah: *See*—
Keutel, Hans J., 4,046,633, Cl. 195-103.50R.

University of Virginia, The: *See*—
Gainer, John L., 4,046,880, Cl. 424-180.000.

Untch, Karl G.: *See*—
Kluge, Arthur F.; Untch, Karl G.; and Fried, John H., 4,046,801, Cl. 560-121.000.

UOP Inc.: *See*—
Antos, George J., 4,046,711, Cl. 252-441.000.
Asselin, George F., 4,046,675, Cl. 208-321.000.
Asselin, George F., 4,046,676, Cl. 208-321.000.
Burton, Vance P.; and Mikulicz, Michael Z., 4,046,516, Cl. 23-288.00E.
Carson, Don B., 4,046,639, Cl. 203-11.000.
Carson, Don B., 4,046,640, Cl. 203-11.000.
Fickel, R. Gene, 4,046,638, Cl. 203-1.000.
Mitsche, Roy T.; Kuntz, Hillard L.; and Hayes, John C., 4,046,713, Cl. 252-455.00Z.
O'Hara, Mark J., 4,046,714, Cl. 252-455.00R.
Pollitzer, Ernest L.; and Hayes, John C., 4,046,672, Cl. 208-139.000.
Pollitzer, Ernest L.; and Hayes, John C., 4,046,828, Cl. 260-673.500.
Riedl, Frederick J.; and Schimmelpfennig, George A., 4,046,015, Cl. 73-421.50R.
Schmerling, Louis, 4,046,819, Cl. 260-648.00R.

Upjohn Company, The: *See*—
Hessler, Edward J., 4,046,800, Cl. 260-465.00E.
Johnson, Herbert G., 4,046,910, Cl. 424-278.000.
Sekhar, Neel C., 4,046,915, Cl. 424-317.000.

Uraneck, Carl A.: *See*—
Selman, Charles M.; and Uraneck, Carl A., 4,046,745, Cl. 260-77.5CR.

Urmann, Ernst: *See*—
Schepers, Bernhard; Bayer, Gerhard; Urmann, Ernst; and Schanz, Klaus, 4,046,855, Cl. 423-130.000.

Urui, Kiyoshi, to Tokyo Shibaura Electric Co., Ltd. Conference trunk circuit for an exchange. 4,046,966, Cl. 179-18.0BC.

Usuda, Matsuo: *See*—
Takechi, Hiroshi; Abe, Mitsunobu; Usuda, Matsuo; and Komiya, Kunihiko, 4,046,597, Cl. 148-12.00R.

Utamura, Yukihiko: *See*—
Kishino, Takao; Morimoto, Kiyoshi; and Utamura, Yukihiko, 4,047,072, Cl. 313-496.000.
Kishino, Takao; Yamaguchi, Nobuo; and Utamura, Yukihiko, 4,047,074, Cl. 313-497.000.

V-Mark Automation Ltd.: *See*—
Klein, Edward, 4,046,616, Cl. 156-559.000.

Vachris, Paul F. Crank shaft. 4,046,028, Cl. 74-597.000.

Vadnais, Kenneth. Portable sled. 4,046,393, Cl. 280-19.000.

Valentine, Sandra. Disposable diaper dispenser vending unit. 4,046,243, Cl. 194-10.000.

Vallotton, Wilbur C.: *See*—
Vykukal, Hubert C.; King, Reginald F.; and Vallotton, Wilbur C., 4,046,262, Cl. 214-1.0CM.

Van Allen, David E.: *See*—
Johnson, Bruce K.; Van Allen, David E.; and Whiteside, George D., 4,047,192, Cl. 354-83.000.

Van Bouwel, Leo Pa ul: *See*—
Stievenart, Emile Frans; Plessers, Hendrik Sylvester; Neujens, Georges Jozef; and Van Bouwel, Leo Pa ul, 4,047,193, Cl. 354-105.000.

van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, to C. van der Lely N. V. Cultivators. 4,046,202, Cl. 172-72.000.

van der Lely, Cornelis. Soil cultivating implements or rotary harrows. 4,046,201, Cl. 172-59.000.

van Hesden, Jan Willem, to Borg-Warner Corporation. Lapping compositions comprising an aluminum, dialkyl orthophosphate gelling agent. 4,046,524, Cl. 51-306.000.

van Iseghem, Paul; Vlasak, Thomas; and Zimmermann, Wolfgang, to BBC Brown, Boveri & Company, Limited. Method of producing semiconductor components and product thereof. 4,046,608, Cl. 148-188.000.

van Wersch, Kurt, to A. Monforts. Method of producing an endless follower, and product per se. 4,046,942, Cl. 428-255.000.

Varian Associates: *See*—
Welch, Kimo M., 4,047,102, Cl. 324-33.000.

Varlam, Toma: *See*—
Cornelius, Gerhard; Marschner, Friedemann; Supp, Emil; and Varlam, Toma, 4,045,960, Cl. 60-648.000.

Vasile, Carmine F.: *See*—
Lim, Teong C.; Tarakci, Umit; and Vasile, Carmine F., 4,047,130, Cl. 333-72.000.

Vaughan, Lawrence G., to Du Pont de Nemours, E. I., and Company. Production of hydrogen peroxide. 4,046,868, Cl. 423-588.000.

Vavra Plat AB of Kungaly: *See*—
Virgin, Eskil, 4,046,409, Cl. 285-305.000.

Veale, John R. Audio fidelity frequency equalizer system. 4,046,960, Cl. 179-1.00D.

Veeder, Richard K., to Ferro Corporation. Air diffuser element. 4,046,845, Cl. 261-122.000.

Veith, Werner, to Siemens Aktiengesellschaft. Discharge display device (plasma-panel). 4,047,077, Cl. 315-169.0TV.

Velazquez, Juan F., to Sycor, Inc. Impact matrix print head solenoid assembly. 4,046,244, Cl. 197-1.00R.

Velo Dalbrenta, Gianfranco. Liquidtight tank made of prestressed reinforced concrete, particularly for purification plants. 4,045,929, Cl. 52-224.000.

Velsicol Chemical Corporation: *See*—
Krenzer, John, 4,046,554, Cl. 71-118.000.
Krenzer, John; and Wu, Chin Ching, 4,046,768, Cl. 260-294.80D.
Smith, Ray E., 4,046,701, Cl. 252-8.100.
Stach, Leonard J., 4,046,884, Cl. 424-210.000.

Ventura, Frank D.: *See*—
Ensmann, Burt; Nielsen, Edwin A.; Snyder, Edward, III; and Ventura, Frank D., 4,045,908, Cl. 46-204.000.

Venuto, Paul B.: *See*—
Owen, Hartley; and Venuto, Paul B., 4,046,825, Cl. 260-668.00R.
Owen, Hartley; Venuto, Paul B.; and Habib, Edward T., Jr., 4,046,827, Cl. 260-672.00T.

Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft: *See*—
Kagerhuber, Franz; and Scheurecker, Werner, 4,046,188, Cl. 164-282.000.

Vernaleken, Hugo: *See*—
Adelmann, Siegfried; Margotte, Dieter; Merten, Josef; and Vernaleken, Hugo, 4,046,836, Cl. 260-860.000.

Vertes, Michael A.; Ronzio, Richard A.; and Kearns, Tommy C., to Amax Inc. Purification process for technical grade molybdenum oxide. 4,046,852, Cl. 423-58.000.

Verweij, Jan; and Tan, Hong Sheng, to Gist-Brocades N.V. Process for preparing cephalosporin derivatives. 4,046,761, Cl. 544-17.000.

Vetter, Hans: *See*—
Odenwalder, Heinrich; Ranz, Erwin; Puschel, Walter; and Vetter, Hans, 4,046,574, Cl. 96-99.000.

Vial, Guy Aime, to Vial S.A.R.L. Cutting-off machine working by electric sparking. 4,046,984, Cl. 219-69.00E.

Vial S.A.R.L.: *See*—
Vial, Guy Aime, 4,046,984, Cl. 219-69.00E.

Vicon Industries, Inc.: *See*—
Randmae, Rein, 4,046,929, Cl. 427-164.000.

Vida, Julius A.: *See*—
Samour, Carlos M.; and Vida, Julius A., 4,046,894, Cl. 424-254.000.

Vidal, Henri C. Quay structure. 4,045,965, Cl. 61-39.000.

Vidnovic, Sam S. Magnetic collection device for bingo chips and similar game parts. 4,046,383, Cl. 273-148.00R.

Viletto, Felix A. Ball ski binding. 4,046,400, Cl. 280-626.000.

Villiers, Walter H.: *See*—
Adlon, Bruce E.; Villiers, Walter H.; and Tarnoff, Sherwin S., 4,045,896, Cl. 40-106.100.

Virgin, Eskil, to Vavra Plat AB of Kungaly. Joining arrangement for ventilation ducts and the like. 4,046,409, Cl. 285-305.000.

Virog, John J., Jr.; Von Hagel, Leo; and Platte, Richard L., to Honeywell Farms Inc. Milk bottles. 4,046,275, Cl. 215-1.00C.

Vitols, Visvaldis A.; and Riganati, John P., to Rockwell International Corporation. Operator interactive pattern processing system. 4,047,154, Cl. 340-146.30E.

Vittoz, Eric: *See*—
Perotto, Jean Felix; and Vittoz, Eric, 4,047,010, Cl. 235-156.000.

Vlasak, Thomas: *See*—
van Iseghem, Paul; Vlasak, Thomas; and Zimmermann, Wolfgang, 4,046,608, Cl. 148-188.000.

Voegeli, Henry C. Method and apparatus for dispensing flexible materials. 4,046,281, Cl. 221-23.

Volk, Charles E.: *See—*
Clark, Lowell E.; Roop, Raymond M.; and Volk, Charles E., 4,047,218, Cl. 357-34.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Bigalke, Erhard; Wolf, Jurgen; and Schmelzer, Gunther, 4,046,129, Cl. 123-32.0EA.

Vollmer, Rudolph: *See—*
Braukmann, Bernhard W.; and Vollmer, Rudolph, 4,046,692, Cl. 210-108.000.

von Dreusche, Charles F., Jr., to Nichols Engineering & Research Corporation. Treatment of waste material containing alkali metals in a controlled atmosphere furnace. 4,046,086, Cl. 110-12.000.

Von Hagel, Leo: *See—*
Virog, John J., Jr.; Von Hagel, Leo; and Platte, Richard L., 4,046,275, Cl. 215-1.00C.

von Strandtmann, Max: *See—*
Connor, David T.; Young, Patricia A.; and von Strandtmann, Max, 4,046,769, Cl. 260-295.00T.

von Tobel, Hans: *See—*
Moser, Helmut; and von Tobel, Hans, 4,046,502, Cl. 8-7.000.

Vorbiev, Grigory Vasilievich: *See—*
Kholmogorov, Mikhail Vladimirovich; Katkov, Jury Vasilievich; Vorbiev, Grigory Vasilievich; Gusev, Alexandr Mikhailovich; and Nazaretian, Eduard Gurgenovich, 4,045,991, Cl. 72-251.000.

Vork, William Duncan: *See—*
Hoekstra, Joop Frans; Lumby, Donovan Harold; and Vork, William Duncan, 4,046,287, Cl. 222-16.000.

Vortec Corporation: *See—*
Inglis, Leslie R., 4,046,492, Cl. 417-197.000.

Voth, Elmer D.: *See—*
Mullet, David L.; Rilling, Raymond J.; and Voth, Elmer D., 4,046,200, Cl. 172-14.000.

Voytko, Joseph, to Westvaco Corporation. Return mail container. 4,046,311, Cl. 229-40.000.

Vykukal, Hubert C.; King, Reginald F.; and Vallotton, Wilbur C., to United States of America, National Aeronautics and Space Administration. Anthropomorphic master/slave manipulator system. 4,046,262, Cl. 214-1.0CM.

W. A. Krueger Co.: *See—*
Dunlap, Clifford E., 4,046,259, Cl. 209-111.70R.

W. G. Jaques Company: *See—*
Bowen, James H., 4,045,876, Cl. 33-126.600.

Waagner-Biro Aktiengesellschaft: *See—*
Fritz, Kurt; and Beckmann, Georg, 4,046,110, Cl. 122-32.000.

Wachi, Shigeaki: *See—*
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,047,089, Cl. 363-49.000.

Wada, Masami; Kodama, Masahiro; and Kawasaki, Shinkichi, to Rikagaku Kenkyusho. Method of determining the water equivalent depth of snowfall using neutrons of cosmic rays. 4,047,042, Cl. 250-390.000.

Wagler, Werner: *See—*
Eggenmuller, Alfred; Bellan, Heinrich; Scherer, Lorenz; Notter, Eugen; and Wagler, Werner, 4,046,068, Cl. 100-65.000.

Wagner Electric Corporation: *See—*
Atkins, Carl E., 4,047,156, Cl. 340-171.00A.

Wagner, William: *See—*
Marshall, Henry James; Windblad, Stuart Walter; and Wagner, William, 4,046,180, Cl. 144-117.00B.

Wahle, Gunter, to Hauni-Werke Korber & Co. KG. Filter rod making machine. 4,046,064, Cl. 93-1.00C.

Waitman, Thomas Frank: *See—*
Lyman, Richard Ricker; and Waitman, Thomas Frank, 4,047,248, Cl. 364-900.000.

Walford, Richard L. Apparatus for the manufacture of weft inserted non-woven fabrics. 4,045,847, Cl. 28-101.000.

Walkden, Anthony John: *See—*
Reece, Albert Benjamin John; and Walkden, Anthony John, 4,047,063, Cl. 310-232.000.

Walsh, Edward N., to Stauffer Chemical Company. Methoxy-substituted cyanophenyl ester derivatives of phosphorus acids as insecticidal agents. 4,046,885, Cl. 424-210.000.

Walter, Hans U.: *See—*
United States of America, National Aeronautics and Space Administration; Walter, Hans U.; and Snyder, Robert S., 4,046,617, Cl. 156-601.000.

Walter Kidde & Company, Inc.: *See—*
Shanmugasundaram, Venkatachalam, 4,045,923, Cl. 52-118.000.

Walter, Llewellyn L.: *See—*
Blaisdell, Donald S.; and Walter, Llewellyn L., 4,046,218, Cl. 180-155.000.

Walters, Robertus Aloysius Tarcisius Johannes: *See—*
Abrahams, Jacobus Hubertus; Collette, Joannes Jacobus Maria; and Walters, Robertus Aloysius Tarcisius Johannes, 4,045,978, Cl. 60-521.000.

Warawa, Edward John, to Abbott Laboratories. 7-Aza-11,12-Dioxa-6-phenyl-tricyclo[7,2,1,$0^{1,6}$]dodecane derivatives and process for their preparation. 4,046,892, Cl. 424-248.570.

Ward, Gerald G., to International Harvester Company. Folding tool bar for agricultural implements. 4,046,203, Cl. 172-456.000.

Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., to United States of America, Agriculture. Glassy materials from plumbites and cellulosics. 4,046,953, Cl. 428-426.000.

Ware, R. Louis. Versatile horticultural growth apparatus. 4,045,911, Cl. 47-39.000.

Warner, Dennis L.: *See—*
Frank, Thomas E.; Gum, Roy E.; Shoupe, J. T.; and Warner, Dennis L., 4,046,469, Cl. 355-13.000.

Warner-Lambert Company: *See—*
Connor, David T.; Young, Patricia A.; and von Strandtmann, Max, 4,046,769, Cl. 260-295.00T.
Zinnes, Harold; and Linda, Neil A., 4,046,778, Cl. 260-326.340.

Warner, Leadom A.; and Cleveland, Joseph J., to GTE Sylvania Incorporated. Method for producing a bilayered green ceramic tape. 4,046,612, Cl. 156-205.000.

Warnke, Heinrich; and Kaup, Friedel, to Miele & Cie. Method of galvanizing steel parts. 4,046,646, Cl. 204-38.00B.

Warren, Joe Edward: *See—*
Baumhauer, John Charles, Jr.; Brzezinski, Alex Michael; Warren, Joe Edward; and Whitesell, Stephen Reed, 4,046,974, Cl. 179-111.00R.

Warwick Electronics Inc.: *See—*
Roberts, Patrick S., 4,046,047, Cl. 84-1.010.

Wasson, George E.: *See—*
Gorin, Everett; Jasulaitis, William A.; Wasson, George E.; and Theodore, Frank William, 4,046,496, Cl. 425-222.000.

Watanabe, Kazutaka; Shimizu, Misao; and Sugawara, Akihiro, to Kabushikikaisha Yokogawa Denki Seisakusho. Data communication system using photocouplers. 4,046,959, Cl. 178-68.000.

Watanabe, Shigeo: *See—*
Takahashi, Hidenori; Tamura, Hiroshi; Watanabe, Shigeo; and Sogi, Toshiyuki, 4,046,183, Cl. 152-362.00R.

Waterman, Michael W.; and Foster, Samuel L., to Allis-Chalmers Corporation. Stationary induction apparatus having means to monitor insulation dryness. 4,047,239, Cl. 361-270.000.

Waters, William J.: *See—*
Freche, John C.; and Waters, William J., 4,046,560, Cl. 75-170.000.

Watkins, Richard Kenneth; and Layman, William S., to Mead Corporation, The. Apparatus and method for testing article carriers. 4,046,000, Cl. 73-95.000.

Watts, Geoffrey B.: *See—*
Showalter, Lane Crawford; Brokenshire, John Leslie; and Watts, Geoffrey B., 4,045,997, Cl. 73-23.000.

Weatherhead Company, The: *See—*
Klingenberg, James C.; Patel, Hiralal V.; and Morse, Philip W., 4,046,315, Cl. 233-4.000.

Weaver, Harry R.: *See—*
Ammon, J. Preston; Weaver, Harry R.; and Rodriguez, Claude, 4,045,868, Cl. 29-629.000.

Weaver, Kenneth E., to Machlett Laboratories, Inc., The. Anode heat monitoring means. 4,047,044, Cl. 250-402.000.

Weaver, Mark, to Phillips-Van Heusen Corporation. Shirt package. 4,046,253, Cl. 206-278.000.

Wegmann & Co.: *See—*
Dieling, Hans; and Schindehutte, Manfred, 4,046,080, Cl. 105-133.000.

Weirich, Walter: *See—*
Becker, Kunibert; and Weirich, Walter, 4,046,060, Cl. 91-414.000.

Weiss, Martin Joseph: *See—*
Schaub, Robert Eugene; and Weiss, Martin Joseph, 4,046,787, Cl. 260-399.000.

Welch, Kimo M., to Varian Associates. Dual chamber, high sensitivity gas sensor and pump. 4,047,102, Cl. 324-33.000.

Welker, Robert H., to Libbey-Owens-Ford Company. Scored glass bracket breaking apparatus. 4,046,300, Cl. 225-103.000.

Wells, William M., to Hudson, Thomas H., a part interest. Multi-directional positioner. 4,045,958, Cl. 60-325.000.

Wendt, Karl Lennart. Method and apparatus for producing single flows of grains. 4,046,285, Cl. 221-157.000.

Weppler, Millie T. Glove for ring display. 4,045,824, Cl. 2-163.000.

West, Theodore V., to United States Steel Corporation. Method and apparatus for cutting open hollow articles. 4,046,038, Cl. 82-47.000.

Westerlund, Gothe Oscar, to Chemetics International Ltd. Electrode assembly for diaphragm cells. 4,046,665, Cl. 204-282.000.

Western Electric Company, Inc.: *See—*
Burden, David M.; and Malaney, Frank N., 4,047,143, Cl. 337-239.000.
Knipper, Gary L., 4,047,245, Cl. 364-200.000.
Schroeder, Charles Martin, Jr., 4,046,298, Cl. 225-2.000.
Smithgall, David Harry, Sr., 4,046,536, Cl. 65-2.000.

Western Gear Corporation: *See—*
Shutt, Donald P., 4,046,235, Cl. 188-134.000.

Westervelt, Dean C.; Scala, Luciano C.; Saunders, Howard E.; and Ciliberti, David F., to Westinghouse Electric Corporation. Wire cleaning system. 4,046,592, Cl. 134-1.000.

Westinghouse Air Brake Company: *See—*
Buzzard, Kenneth J., 4,046,342, Cl. 246-34.00R.

Westinghouse Electric Corporation: *See—*
Anderson, Paul T.; and Dobrosielski, Stephen S., 4,047,140, Cl. 337-75.000.
Bauerle, James E.; Reed, William H.; and Berkey, Edgar, 4,047,101, Cl. 324-33.000.
Day, Clifford K.; and Stringer, James L., 4,047,103, Cl. 324-34.00D.
Dougherty, Michael L., 4,046,193, Cl. 165-105.000.
Elco, Richard A.; Bauer, James A.; and Treese, Willard E., 4,046,649, Cl. 204-58.000.
Francombe, Maurice H.; and Wu, Shu-Yau, 4,047,214, Cl. 357-23.000.
Gyugyi, Laszlo; Stacey, Eric J.; and Brennen, Michael B., 4,047,097, Cl. 323-119.000.
Heiser, Richard S.; and Aanstad, Ola J., 4,047,005, Cl. 235-151.210.

Henderson, Benjamin B., 4,047,024, Cl. 250-231.0SE.
Kaczmarek, Thomas D.; and Phillips, David C., 4,046,512, Cl. 23-253.0TP.
Kernick, Andress; and Geyer, Manvel A., 4,046,229, Cl. 187-29.00R.
Kirsch, Andrew F.; and Winkler, Charles L., 4,046,227, Cl. 187-29.00R.
Maier, Alfred E.; and Stephenson, William I., Jr., 4,047,134, Cl. 335-23.000.
McCaskey, Harold O., Jr.; and Brooker, Lenon G., 4,046,937, Cl. 428-211.000.
Meyer, Charles A., 4,046,388, Cl. 277-53.000.
Milberger, Walter E.; and Klein, Gerald I., 4,047,046, Cl. 307-101.000.
Miller, Coleman J., 4,047,173, Cl. 343-17.2PC.
Morrison, Steven; and Williams, George A., 4,047,014, Cl. 235-189.000.
Peterson, Robert S., 4,047,080, Cl. 318-79.000.
Powell, Bruce A., 4,046,228, Cl. 187-29.00R.
Rao, Dhulipala M., 4,047,122, Cl. 330-84.000.
Smith, James D. B.; and Phillips, David C., 4,046,733, Cl. 260-33.6EP.
Smith, James D. B.; and Phillips, David C., 4,046,943, Cl. 428-339.000.
Westervelt, Dean C.; Scala, Luciano C.; Saunders, Howard E.; and Ciliberti, David F., 4,046,592, Cl. 134-1.000.
Wood, Kenneth E.; and O'Farrell, James T., 4,047,147, Cl. 340-3.00R.

Westvaco Corporation: *See*—
Voytko, Joseph, 4,046,311, Cl. 229-40.000.

Weuger, Karl W. Pneumatic loom. 4,046,174, Cl. 139-437.000.

Wey, Jong-Shinn: *See*—
Terwilliger, James P.; Gingello, Anthony D.; and Wey, Jong-Shinn, 4,046,576, Cl. 96-108.000.

Wheeler, Walter Morris; and Ocker, Klaus Frederick, to Allied Chemical Corporation. Support for safety belt retractor inertia mechanism. 4,046,332, Cl. 242-107.40A.

Whitaker, Ralph, to Fred Whitaker Company. Method of producing a warp of intermittently colored yarns. 4,045,848, Cl. 28-218.000.

Whitcomb, James Arthur: *See*—
Huizinga, Donald Dean; Underhill, Edward William; and Whitcomb, James Arthur, 4,046,972, Cl. 179-99.000.

White, Abraham; and Burton, Pamela M., to Syntex (U.S.A.) Inc. Method of increasing immunologic competence. 4,046,877, Cl. 424-177.000.

White, Charles R., to Newco Fireplace Equipment Limited, Inc. Self extinguishing, portable cooking unit having folding fuel trays. 4,046,132, Cl. 126-9.00R.

White, Harold R., to Alar Engineering Corporation. Method of manufacturing filter drums. 4,045,853, Cl. 29-163.50F.

White, Joseph Paul; and Kannam, Peter Joseph, to RCA Corporation. High voltage semiconductor device having a novel edge contour. 4,047,196, Cl. 357-55.000.

White, Thomas J.; Spence, Henry L.; and McClelland, Etheridge R., to Filper Corporation. Baler system and method. 4,045,940, Cl. 53-26.000.

White, William E., to Eastman Kodak Company. Temperature sensing and control of a fusing roll. 4,046,990, Cl. 219-471.000.

Whitehurst, Darrell Duayne: *See*—
Farcasiu, Malvina; and Whitehurst, Darrell Duayne, 4,046,668, Cl. 208-11.0LE.

Whitesell, Stephen Reed: *See*—
Baumhauer, John Charles, Jr.; Brzezinski, Alex Michael; Warren, Joe Edward; and Whitesell, Stephen Reed, 4,046,974, Cl. 179-111.00R.

Whiteside, George D.: *See*—
Johnson, Bruce K.; and Whiteside, George D., 4,047,190, Cl. 354-27.000.
Johnson, Bruce K.; Van Allen, David E.; and Whiteside, George D., 4,047,192, Cl. 354-83.000.

Whitley, Gerald E. Pipe clamping tool assembly. 4,046,363, Cl. 269-228.000.

Whitney, Dorothy. Beauty paddle. 4,046,142, Cl. 128-55.000.

WIBAU (Westdeutsche Industrie- und Strassenbau-Maschinen Gesellschaft m.b.H.): *See*—
Bender, Horst, 4,046,166, Cl. 137-625.480.

Wick, Manfred: *See*—
Deinhammer, Wolfgang; Wick, Manfred; and Macri, Antonio, 4,046,792, Cl. 260-429.700.

Wickham, Robert G. Radiator cooling fan. 4,046,488, Cl. 416-210.00R.

Wickman Machine Tool Sales Limited: *See*—
Yearsley, Norman, 4,046,036, Cl. 82-2.700.

Widen, Birger, to Widens Elautomatik AB. Bistable position indicating device. 4,047,137, Cl. 335-234.000.

Widens Elautomatik AB: *See*—
Widen, Birger, 4,047,137, Cl. 335-234.000.

Wiedermann, Rolf: *See*—
Eimers, Erich; Dhein, Rolf; and Wiedermann, Rolf, 4,046,742, Cl. 260-77.5AN.

Wiese, Gary E.: *See*—
Moskovich, Jacob; Wiese, Gary E.; Altman, Richard M.; and McLaughlin, Thomas D., 4,047,222, Cl. 354-155.000.

Wijnterp, Wierd, to Heemaf B.V. Brushless three-phase current generator having a device for self-excitation and automatic control of the energizing current. 4,047,095, Cl. 322-17.000.

Wikel, James H.: *See*—
Paget, Charles J.; and Wikel, James H., 4,046,770, Cl. 260-305.000.

Wilcox, Merrill. N-Benzyl-2,6-dinitro-3-amino-4-trifluoromethylanilines as plant growth regulants. 4,046,809, Cl. 260-570.900.

Wilhelm, Frederick C., to Universal Oil Products Company. Nonacidic multimetallic dehydrogenation catalyst. 4,046,715, Cl. 252-466.00B.

Wilkinson, Robert M.; and Lyon, James R., to Altor Box Board Company. Rigid-when-wet paperboard containers and their manufacture. 4,046,935, Cl. 428-182.000.

Wilkus, Edward Vincent: *See*—
Lever, Ray Clarence; and Wilkus, Edward Vincent, 4,046,849, Cl. 264-174.000.

Williams, Bruce C.: *See*—
McCaffrey, Terence; Raza, Hassan; and Williams, Bruce C., 4,047,217, Cl. 357-34.000.

Williams, David J.: *See*—
Pearson, James M.; Williams, David J.; and Limburg, William W., 4,046,563, Cl. 96-1.50R.

Williams, George A.: *See*—
Morrison, Steven; and Williams, George A., 4,047,014, Cl. 235-189.000.

Williams, Larry Thomas; and Williams, William Jerry. Electronic minnow counter. 4,046,996, Cl. 235-92.0PK.

Williams, William Jerry: *See*—
Williams, Larry Thomas; and Williams, William Jerry, 4,046,996, Cl. 235-92.0PK.

Wills, John Haines. Alkaline glass melting with porous cover. 4,046,544, Cl. 65-27.000.

Wilson, Charles A.; and Moran, Patrick J., to United States of America, Navy. Target for torpedo launch system. 4,046,993, Cl. 235-61.50D.

Wilson, Kathleen V. Hand loom. 4,046,171, Cl. 139-29.000.

Wimsatt, James M.: *See*—
Parise, Carl; Blackman, Ralph Eugene; and Wimsatt, James M., 4,046,989, Cl. 219-437.000.

Winant, Arnold Francis, to Gim Metal Products. Casting construction. 4,047,021, Cl. 240-78.00E.

Winch, Andrew Gordon, to Raleigh Industries Limited. Wheel truing machine. 4,045,852, Cl. 29-159.020.

Winchell, David A.; Miller, Joe A.; and Martin, Jerry D., to Baxter Travenol Laboratories, Inc. Port protector cap for a container. 4,046,276, Cl. 215-250.000.

Winckler, Richard, to Cebal. Method of assembling an aerosol dispenser. 4,045,860, Cl. 29-451.000.

Winckler, Rudolf: *See*—
Hartmann, Gunter; and Winckler, Rudolf, 4,045,869, Cl. 29-630.00A.

Windblad, Stuart Walter: *See*—
Marshall, Henry James; Windblad, Stuart Walter; and Wagner, William, 4,046,180, Cl. 144-117.00B.

Winkelmann, Erhardt; and Raether, Wolfgang, to Hoechst Aktiengesellschaft. 1-Methyl-2-(pyridyl-oxymethyl)-5-nitro-imidazoles. 4,046,896, Cl. 424-263.000.

Winkler, Charles L.: *See*—
Kirsch, Andrew F.; and Winkler, Charles L., 4,046,227, Cl. 187-29.00R.

Winkler, Franz; and Helf, Harald, to Kraftwerk Union Aktiengesellschaft. Pressurized-water reactor emergency core cooling system. 4,046,626, Cl. 176-38.000.

Winkler, Otto, to Balzers Patent-und Beteiligungs-Aktiengesellschaft. Vacuum apparatus for treating articles, particularly a vacuum evaporator. 4,046,101, Cl. 118-49.100.

Wisconsin Alumni Research Foundation: *See*—
Arny, Deane C.; and Lindow, Steven E., 4,045,910, Cl. 47-2.000.

Wismer, Marco: *See*—
Schimmel, Karl F.; and Wismer, Marco, 4,046,949, Cl. 428-411.000.

Witriol, Norman M.; and Frederick, Carlton L. Encoding altimeter. 4,047,001, Cl. 235-151.300.

Witte, Johan Frederik, to Stork Amsterdam B.V. Process for treating oil containing vegetable raw materials. 4,045,879, Cl. 34-31.000.

Witte, Josef: *See*—
Lehnert, Gunther; Maertens, Dieter; Pampus, Gottfried; and Witte, Josef, 4,046,710, Cl. 252-429.00B.

Wittman, Robert H.; and Howell, William G., to Exxon Research and Engineering Company. Process for explosively joining two pipe sections. 4,046,301, Cl. 228-108.000.

Wohlers, Robert J., to United States of America, Army. Method of reducing the radar cross-section of a dielectric body. 4,047,174, Cl. 343-18.00B.

Wolf, Gerhard, to Siemens Aktiengesellschaft. Storage arrangement having a device to determine free storage locations. 4,047,160, Cl. 364-900.000.

Wolf, Jurgen: *See*—
Bigalke, Erhard; Wolf, Jurgen; and Schmelzer, Gunther, 4,046,129, Cl. 123-32.0EA.

Wolpers, Jurgen: *See*—
Baxmann, Fritz; Frese, Albert; Roben, Hermann; and Wolpers, Jurgen, 4,046,945, Cl. 428-282.000.

Wong, Eugene: *See*—
Sloane, Edwin A.; McKeever, Bruce T.; and Wong, Eugene, 4,047,002, Cl. 235-151.300.

Wong, Herbert Vernon, to Becton, Dickinson Electronics Company. Transducer. 4,047,144, Cl. 338-2.000.

Wong, Michael: *See*—
Balgemann, Dennis Erwin; and Wong, Michael, 4,046,108, Cl. 119-18.000.

Wood, Kenneth E.; and O'Farrell, James T., to Westinghouse Electric

Corporation. Dual beam sonar display system. 4,047,147, Cl. 340-3.00R.

Wood, Michael J., to J. P. Burroughs & Son, Inc. Continuous flow expander for expanding particulate material. 4,046,066, Cl. 99-323.700.

Wood, Thomas K.; and Margreither, Alan R., to Potters Industries, Inc. Apparatus for producing spherical particles. 4,046,548, Cl. 65-142.000.

Woods, Robert L.: *See—*
Fairchild, Jack E.; Maurer, Bruce E.; and Woods, Robert L., 4,046,489, Cl. 416-223.00R.

Woods, William E.: *See—*
Stanley, Philip E.; Woods, William E.; and Izbicki, Kenneth J., 4,047,247, Cl. 364-200.000.

Woods, William G.; and Hunter, Don L., to United States Borax & Chemical Corporation. 3-Halo-2,6-dinitro-4-trifluoromethylanilines. 4,046,758, Cl. 260-239.00E.

Woodstream Corporation: *See—*
Souza, Anthony J., 4,045,905, Cl. 43-88.000.
Woolworth, Richard G., 4,045,889, Cl. 36-122.000.

Woodward, John Maury: *See—*
Branham, Charles Escom; Steury, Thomas Dean; and Woodward, John Maury, 4,046,471, Cl. 355-14.000.

Woodward, Thomas D.; and Worsley, Gail G., to Rexnord Inc. Retainer for slip sleeve liners. 4,045,980, Cl. 64-23.000.

Woolworth, Richard G., to Woodstream Corporation. Snowshoe. 4,045,889, Cl. 36-122.000.

Work, Gerald L., to American Sign and Indicator Corporation. Display sign. 4,045,895, Cl. 40-28.00C.

Wormmeester, Gerhardus J.; and Rijsenbrij, Joannes C., to Europe Container Terminus B.V. Loading and unloading bridge for containers. 4,046,265, Cl. 214-14.000.

Worsley, Gail G.: *See—*
Woodward, Thomas D.; and Worsley, Gail G., 4,045,980, Cl. 64-23.000.

Worthington Compressors, Inc.: *See—*
LaCasse, George N., 4,046,209, Cl. 180-9.520.

Wright, John T., to Champion International Corporation. Fire resistant, sound attenuating, drop seal door. 4,045,913, Cl. 49-307.000.

Wright, Lawrence T.: *See—*
Ashare, Edward; Rulison, Richard N.; Wright, Lawrence T.; and Coplan, Myron J., 4,045,851, Cl. 29-157.00R.

Wright State University: *See—*
Harris, Frank W.; and Reinhardt, Bruce A., 4,046,814, Cl. 260-590.00E.

Wu, Che-Kuang: *See—*
Sanford, Leon M.; and Wu, Che-Kuang, 4,046,545, Cl. 65-30.00R.

Wu, Chin Ching: *See—*
Krenzer, John; and Wu, Chin Ching, 4,046,768, Cl. 260-294.80D.

Wu, Ching H.: *See—*
Brown, Alfred; Hager, Stephen F.; Chichakli, Moutaz; and Wu, Ching H., 4,046,196, Cl. 166-273.000.

Wu, Mu Tsu: *See—*
Fisher, Michael H.; and Wu, Mu Tsu, 4,046,753, Cl. 260-158.000.

Wu, Shu-Yau: *See—*
Francombe, Maurice H.; and Wu, Shu-Yau, 4,047,214, Cl. 357-23.000.

Wu, Yao Hua; and Lobeck, Walter G., Jr., to Mead Johnson & Company. Smooth muscle relaxant process employing 10-imidoylphenoxazines. 4,046,891, Cl. 424-248.400.

Xerox Corporation: *See—*
Akman, Alptekin, 4,046,928, Cl. 427-12.000.
Cocksedge, Kenneth W., 4,047,086, Cl. 318-608.000.
Eichorn, Roger H., deceased; Silverberg, Morton; and Mandrino, Russell J., executor, 4,046,472, Cl. 355-14.000.
Frechette, Kenneth R., 4,046,245, Cl. 197-60.000.
Gomez, Nicolas Gueco, 4,046,105, Cl. 118-429.000.
Hudson, Frederick W., 4,046,682, Cl. 209-250.000.
Laskowski, Kenneth W.; and Steiner, Edward L., 4,046,467, Cl. 355-3.00R.
Pearson, James M.; Williams, David J.; and Limburg, William W., 4,046,563, Cl. 96-1.50R.
Trainor, John W., 4,046,473, Cl. 355-16.000.
Treier, George, 4,046,404, Cl. 282-27.500.
Turner, Sam R., 4,046,564, Cl. 96-1.50R.

Xetron Corporation: *See—*
Janning, Eugene A., 4,047,110, Cl. 325-123.000.

Xonics, Inc.: *See—*
Scott, Paul B., 4,046,134, Cl. 126-270.000.

Yagi, Kouichi; Yamanaka, Makoto; and Fujino, Takashi, to Kao Soap Co., Ltd. Stable bleaching detergent composition. 4,046,705, Cl. 252-99.000.

Yagishita, Tohmi; and Hagiya, Hiroshi, to Oki Electric Industry Co., Ltd. Receiving system for facsimile and the like. 4,047,228, Cl. 358-261.000.

Yake, William H., to Design & Manufacturing Corporation. Dishwasher rack. 4,046,261, Cl. 211-41.000.

Yakuboff, Paul D., to Owens-Corning Fiberglas Corporation. Impregnating die. 4,046,103, Cl. 118-125.000.

Yamada, Hirotada; Tobiki, Hisao; Tanno, Norihiko; Shimago, Kozo; Okamura, Kosaku; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; Irie, Kenji; and Eda, Yasuko, to Sumitomo Chemical Company, Limited. Novel penicillin, and its preparation and use. 4,046,904, Cl. 424-271.000.

Yamada, Misao, to Copal Company Limited. Diaphragm blade for cameras and method of making the same. 4,047,212, Cl. 354-270.000.

Yamada, Tetsuo: *See—*
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.

Yamada, Yoshiro: *See—*
Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, 4,046,600, Cl. 148-12.400.

Yamagishi, Hidehisa; and Tanaka, Mizuo, to Nippon Kokan Kabushiki Kaisha. Method for continuously quenching electrolytic tin-plated steel strip while preventing quench stains. 4,046,604, Cl. 148-156.000.

Yamaguchi, Haruo: *See—*
Toda, Koichi; Miki, Tetsuya; and Yamaguchi, Haruo, 4,047,115, Cl. 328-151.000.

Yamaguchi, Nobuo: *See—*
Kishino, Takao; Yamaguchi, Nobuo; and Utamura, Yukihiko, 4,047,074, Cl. 313-497.000.

Yamaguti, Namio, to Matsushita Electric Industrial Co., Ltd. Ghost removing system for use in television receiver. 4,047,224, Cl. 358-166.000.

Yamakoshi, Noboru; Kaneda, Tsugio; Hatsuoka, Nobuyasu; Shimazu, Shinichi; Fujita, Tatsu; Yamada, Yoshiro; Yamada, Tetsuo; and Mizuta, Atsuo, to Kobe Steel Ltd. Method of producing large diameter steel rods. 4,046,600, Cl. 148-12.400.

Yamamoto, Shunji, to Minolta Camera Kabushiki Kaisha. Printing paper cutting device for an electrical copier. 4,046,470, Cl. 355-13.000.

Yamanaka, Makoto: *See—*
Yagi, Kouichi; Yamanaka, Makoto; and Fujino, Takashi, 4,046,705, Cl. 252-99.000.

Yanagita, Yoshio: *See—*
Hayashi, Osamu; Inagaki, Takahumi; and Yanagita, Yoshio, 4,046,158, Cl. 137-88.000.

Yasuda, Hiroshi; and Kanaya, Fumio, to Nippon Telegraph and Telephone Public Corporation. Interframe coding apparatus. 4,047,221, Cl. 358-136.000.

Yearsley, Norman, to Wickman Machine Tool Sales Limited. Bar feed mechanism for lathes. 4,046,036, Cl. 82-2.700.

Yen, Shiao-Ping S.: *See—*
Rembaum, Alan; Yen, Shiao-Ping S.; and Dreyer, William J., 4,046,720, Cl. 260-2.50B.

Yih, Roy Y.: *See—*
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,046,798, Cl. 260-465.00D.

Yokomichi, Isao: *See—*
Takahashi, Ryohei; Fujikawa, Kanichi; Yokomichi, Isao; Tsujii, Yasuhiro; and Sakashita, Nobuyuki, 4,046,553, Cl. 71-94.000.

Yokota, Yukio: *See—*
Inouye, Kozo; Nakamura, Kotaro; Yokota, Yukio; Nakazyo, Kiyoshi; and Okumura, Akio, 4,046,573, Cl. 96-74.000.

Yorks, Robert G.; and Junker, David W., to Essex Group, Inc. Short circuit protection circuit. 4,047,233, Cl. 361-88.000.

Yoshida, Akihiko; and Nishino, Atsushi, to Matsushita Electric Industrial Co., Ltd. Method of manufacturing solid electrolytic capacitor. 4,046,645, Cl. 204-37.00R.

Yoshida, Hiroshi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Strut type independent suspension system for automobiles. 4,046,403, Cl. 280-701.000.

Yoshida, Katsuhiko: *See—*
Iijima, Katsuhiko; and Yoshida, Katsuhiko, 4,046,346, Cl. 248-298.000.

Yoshida Kogyo Kabushiki Kaisha: *See—*
Kando, Akiyoshi, 4,045,845, Cl. 24-205.11F.

Yoshida, Tadao: *See—*
Suzuki, Tadao; Yoshida, Tadao; and Wachi, Shigeaki, 4,047,089, Cl. 363-49.000.

Yoshiura, Koichi: *See—*
Hirai, Yutaka; Miyata, Katsuharu; Osawa, Tagui; Samecima, Muneyasu; Mukai, Ken; Yoshiura, Koichi; and Mori, Hidetoshi, 4,046,785, Cl. 260-380.000.

Young, Dean Arthur, to Union Oil Company of California. Process for removing arsenic from hydrocarbons. 4,046,674, Cl. 208-251.00H.

Young, Patricia A.: *See—*
Connor, David T.; Young, Patricia A.; and von Strandtmann, Max, 4,046,769, Cl. 260-295.00T.

Yu, Chia-Nien, to Morton-Norwich Products, Inc. Bis-[5-(4-chlorophenyl)furfuryl]dialkylammonium bromides. 4,046,781, Cl. 260-347.700.

Yuki, Nakaji, to Director-General of the Agency of Industrial Science and Technology. Method of manufacturing carbonaceous granular molecular sieve. 4,046,709, Cl. 252-421.000.

Yurtin, John A., to General Motors Corporation. Electrical terminal with retracted latch and electrical connector having same. 4,046,450, Cl. 339-217.00S.

Zahid, Abduz, to Greer Hydraulics, Inc. Method of forming a pressure accumulator. 4,045,861, Cl. 29-454.000.

Zahn, Wolfgang; Zangenfeind, Helmut; and Domges, Gunther, to AGFA-Gevaert, Aktiengesellschaft. Splicing apparatus for photographic films or the like. 4,046,614, Cl. 156-353.000.

Zahner, Hans: *See—*
Dahn, Ursula; Hagenmaier, Hanspaul; Hohne, Helmut; Konig, Wilfried; Scheinpflug, Hans; and Zahner, Hans, 4,046,881, Cl. 424-181.000.

Zahnradfabrik Friedrichshafen AG: *See—*
Ott, Anton; Ehrlinger, Friedrich; Knodler, Dietrich; and Zdansevicius, Roland, 4,046,031, Cl. 74-764.000.

Zajic, James Edward; and Kosaric, Naim. Flotation of scheelite from calcite with a microbial based collector. 4,046,678, Cl. 209-166.000.
Zand, Frances Lee. Teaching device for the correction of reading, spelling and writing learning disabilities. 4,045,884, Cl. 35-35.00R.
Zangenfeind, Helmut: *See*—
Zahn, Wolfgang; Zangenfeind, Helmut; and Domges, Gunther, 4,046,614, Cl. 156-353.000.
Zarecky, Frederick D.: *See*—
Miller, James W.; and Zarecky, Frederick D., 4,046,549, Cl. 65-182.00R.
Zdansevicius, Roland: *See*—
Ott, Anton; Ehrlinger, Friedrich; Knodler, Dietrich; and Zdansevicius, Roland, 4,046,031, Cl. 74-764.000.
Zenith Radio Corporation: *See*—
Hofmann, Judson A., 4,047,223, Cl. 358-158.000.
Meehan, David H., 4,047,078, Cl. 315-411.000.
Pittenger, Daniel I., 4,047,225, Cl. 358-190.000.
Zeuner, Kenneth W.; and Jarman, Alonzo B., to Control Concepts, Inc. Electrohydraulic system for towed vehicle. 4,046,399, Cl. 280-420.000.
Zimmerli, Willi, to Ciba-Geigy Corporation. Process for the manufacture of aminoplast and phenoplast moulding compositions using a thin layer evaporator or a roller drier. 4,046,734, Cl. 260-38.000.
Zimmermann, Wolfgang: *See*—
van Iseghem, Paul; Vlasak, Thomas; and Zimmermann, Wolfgang, 4,046,608, Cl. 148-188.000.
Zimonin, Leonid Vasilievich: *See*—
Kreimer, Vladimir Isakovich; Tishkov, Anatoly Yakovlevich; Grigoriev, Vitaly Markovich; Gendlina, Ljudmila Ivanovna; and Zimonin, Leonid Vasilievich, 4,046,249, Cl. 198-758.000.
Zine, Anthony R., Jr., to Corning Glass Works. Access device for centrifugal separation assemblies. 4,046,699, Cl. 210-516.000.
Zinnes, Harold; and Linda, Neil A., to Warner-Lambert Company. Processes for the preparation of 4-hydroxy-2H-1-benzothiopyran-3-carboxamide 1,1-dioxides. 4,046,778, Cl. 260-326.340.
Zlochower, Isaac A., to PPG Industries, Inc. Acid resistant glass fibers. 4,046,948, Cl. 428-392.000.
Zory, Peter Stephen, Jr.: *See*—
Comerford, Liam David; and Zory, Peter Stephen, Jr., 4,047,124, Cl. 331-94.50H.
Zweifel, Hans Heini; Buehler, Arthur; and Fasciati, Alfred, to Ciba-Geigy AG. Commercial packages containing dyestuffs. 4,046,507, Cl. 8-79.000.
308489 Ontario Limited: *See*—
Fleet, Bernard; and Das Gupta, Sankar, 4,046,663, Cl. 204-280.000.
Fleet, Bernard; and Das Gupta, Sankar, 4,046,664, Cl. 204-280.000.
4K - International A/S: *See*—
Boysen, Mogens Bredal, 4,047,047, Cl. 307-106.000.

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 6TH DAY OF SEPTEMBER, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Atlantic Richfield Company: *See*—
Breault, Homer; and Witt, Alvin E., T962,005, Cl. 156-71.000.

Breault, Homer; and Witt, Alvin E., to Atlantic Richfield Company. Simply installed floor tile. T962,005, 9-6-77, Cl. 156-71.000.

Caunt, Anthony David; Newton, Alan Branford; Williams, Ian Gabriel; and Fortuin, Michael Stanley, to Imperial Chemical Industries Limited. Treatment of transition metal compound. T962,007, 9-6-77, Cl. 252-429.00B.

Chandra, Bala Perampalam; Greaves, Jeffrey Chester; and Lovelock, Victor Gordon, to Imperial Chemical Industries Limited. Method of treating polymer latices. T962,008, 9-6-77, Cl. 528-500.000.

Clark, Raymond D.: *See*—
Pacifici, James G.; Clark, Raymond D.; and Newland, Gordon C., T962,006, Cl. 204-159.230.

Dostes, Claude G.; Dubromel, Dany C.; and Le Guen, Jean-Francois. Method of preparing silver halide grains of improved photographic and handling characteristics. T962,004, 9-6-77, Cl. 96-110.000.

Dubromel, Dany C.: *See*—
Dostes, Claude G.; Dubromel, Dany C.; and Le Guen, Jean-Francois, T962,004, Cl. 96-110.000.

Fortuin, Michael Stanley: *See*—
Caunt, Anthony David; Newton, Alan Branford; Williams, Ian Gabriel; and Fortuin, Michael Stanley, T962,007, Cl. 252-429.00B.

Fugitt, Robert Benson. Reduction of 2-acyl-1-naphthols to 2-alkyl-1-naphthols. T962,009, 9-6-77, Cl. 260-624.00C.

Greaves, Jeffrey Chester: *See*—
Chandra, Bala Perampalam; Greaves, Jeffrey Chester; and Lovelock, Victor Gordon, T962,008, Cl. 528-500.000.

Harrison, Cecil P., to Tennessee Valley Authority. Concentrated phosphate rock-water suspension fertilizer. T962,003, 9-6-77, Cl. 71-33.000.

Imperial Chemical Industries Limited: *See*—
Caunt, Anthony David; Newton, Alan Branford; Williams, Ian Gabriel; and Fortuin, Michael Stanley, T962,007, Cl. 252-429.00B.
Chandra, Bala Perampalam; Greaves, Jeffrey Chester; and Lovelock, Victor Gordon, T962,008, Cl. 528-500.000.

Inkpen, Terence: *See*—
Newbury, Frank T.; and Inkpen, Terence, T962,010, Cl. 261-41.00D.

Le Guen, Jean-Francois: *See*—
Dostes, Claude G.; Dubromel, Dany C.; and Le Guen, Jean-Francois, T962,004, Cl. 96-110.000.

Lovelock, Victor Gordon: *See*—
Chandra, Bala Perampalam; Greaves, Jeffrey Chester; and Lovelock, Victor Gordon, T962,008, Cl. 528-500.000.

McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., to Tennessee Valley Authority. Preparation of dicalcium phosphate from phosphate rock by the use of sulfur dioxide, water, and carbonyl compounds. T962,001, 9-6-77, Cl. 423-307.000.

Moore, Francis Paul. Elastic warp knit fabric. T962,002, 9-6-77, Cl. 66-195.000.

Muehlner, Roland O., to Shell Oil Company. Coextruded laminate. T962,011, 9-6-77, Cl. 428-517.000.

Newbury, Frank T.; and Inkpen, Terence. Variable venturi carburetor idle speed fuel control. T962,010, 9-6-77, Cl. 261-41.00D.

Newland, Gordon C.: *See*—
Pacifici, James G.; Clark, Raymond D.; and Newland, Gordon C., T962,006, Cl. 204-159.230.

Newton, Alan Branford: *See*—
Caunt, Anthony David; Newton, Alan Branford; Williams, Ian Gabriel; and Fortuin, Michael Stanley, T962,007, Cl. 252-429.00B.

Pacifici, James G.; Clark, Raymond D.; and Newland, Gordon C. Photopolymerizable polymeric compositions containing aromatic diacrylates. T962,006, 9-6-77, Cl. 204-159.230.

Phillips, John F., Jr.: *See*—
McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., T962,001, Cl. 423-307.000.

Shell Oil Company: *See*—
Muehlner, Roland O., T962,011, Cl. 428-517.000.

Tate, Leslie R.: *See*—
McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., T962,001, Cl. 423-307.000.

Tennessee Valley Authority: *See*—
Harrison, Cecil P., T962,003, Cl. 71-33.000.
McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., T962,001, Cl. 423-307.000.

Williams, Ian Gabriel: *See*—
Caunt, Anthony David; Newton, Alan Branford; Williams, Ian Gabriel; and Fortuin, Michael Stanley, T962,007, Cl. 252-429.00B.

Witt, Alvin E.: *See*—
Breault, Homer; and Witt, Alvin E., T962,005, Cl. 156-71.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF SEPTEMBER, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Akzona Incorporated: *See*—
Fontijn, Wilhelmus J., Re. 29,382, Cl. 57-140.00R.

Atkinson, Alan W., to Turner & Newall Limited. Glass compositions and fibers made therefrom. Re. 29,388, Cl. 106-50.000.

Evers, Hendrikus Willemina, to U.S. Philips Corporation. Electric discharge tube, comprising a highly loaded anode. Re. 29,390, Cl. 313-293.000.

Fontijn, Wilhelmus J., to Akzona Incorporated. Multifilament yarns for reinforcing articles. Re. 29,382, Cl. 57-140.00R.

Gallatin, Robert A.; and Langill, Addison W., Jr., to Process Systems, Inc. Digital fluid flow rate measurement or control system. Re. 29,383, Cl. 137-14.000.

Hudson, Doyle R., to Olinkraft, Inc. Expanding fill spout for bag filling machine. Re. 29,384, Cl. 141-10.000.

Joslyn Mfg. and Supply Co.: *See*—
Kawiecki, Chester J., Re. 29,391, Cl. 337-28.000.

Kawiecki, Chester J., to Joslyn Mfg. and Supply Co. Surge protector assembly. Re. 29,391, Cl. 337-28.000.

Langill, Addison W., Jr.: *See*—
Gallatin, Robert A.; and Langill, Addison W., Jr., Re. 29,383, Cl. 137-14.000.

Lund, Robert S., to Pettibone Corporation. Apparatus for the continuous mixing of granular materials. Re. 29,387, Cl. 259-6.000.

Merkl, George G. Method of preparing aluminum organoiodides. Re. 29,389, Cl. 260-448.00A.

Miksits, Alfred L.: *See*—
Miksitz, Frank J., Re. 29,386, Cl. 222-404.000.

Miksitz, Frank J., to Universal Feeders, Inc. Gravity discharge apparatus. Re. 29,385, Cl. 222-1.000.

Miksitz, Frank J., to Miksits, Alfred L. Gravity discharge apparatus. Re. 29,386, Cl. 222-404.000.

Olinkraft, Inc.: *See*—
Hudson, Doyle R., Re. 29,384, Cl. 141-10.000.

Pettibone Corporation: *See*—
Lund, Robert S., Re. 29,387, Cl. 259-6.000.

Process Systems, Inc.: *See*—
Gallatin, Robert A.; and Langill, Addison W., Jr., Re. 29,383, Cl. 137-14.000.

Turner & Newall Limited: *See*—
Atkinson, Alan W., Re. 29,388, Cl. 106-50.000.

U.S. Philips Corporation: *See*—
Evers, Hendrikus Willemina, Re. 29,390, Cl. 313-293.000.

Universal Feeders, Inc.: *See*—
Miksitz, Frank J., Re. 29,385, Cl. 222-1.000.

LIST OF PLANT PATENTEES

Denver Wholesale Florists Company: *See*—
Euser, Anthony, 4,100, Cl. 70.000.
Krapes, David A., 4,098, Cl. 73.000.
Quinn, Vincent P., 4,099, Cl. 70.000.

Euser, Anthony, to Denver Wholesale Florists Company. Carnation plant named Apache. 4,100, 9-6-77, Cl. 70.000.

Gruis, Jake T.; Riordan, Terrance P.; and Long, John A., to O.M. Scott & Sons Company, The. St. Augustine grass. 4,097, 9-6-77, Cl. 88.000.

Krapes, David A., to Denver Wholesale Florists Company. Carnation plant named Matador. 4,098, 9-6-77, Cl. 73.000.

Long, John A.: *See*—
Gruis, Jake T.; Riordan, Terrance P.; and Long, John A., 4,097, Cl. 88.000.

O.M. Scott & Sons Company, The: *See*—
Gruis, Jake T.; Riordan, Terrance P.; and Long, John A., 4,097, Cl. 88.000.

Quinn, Vincent P., to Denver Wholesale Florists Company. Carnation plant named Georgia Ann. 4,099, 9-6-77, Cl. 70.000.

Riordan, Terrance P.: *See*—
Gruis, Jake T.; Riordan, Terrance P.; and Long, John A., 4,097, Cl. 88.000.

LIST OF DESIGN PATENTEES

Accessories by Sherwood: *See*—
Schemenauer, Dave E., 245,724, Cl. D48-4.00B.

Albert, Ramon Rivera. Sea monster chair. 245,651, 9-6-77, Cl. D6-68.000.

Bartlett, Shirley Ann. Clock. 245,673, 9-6-77, Cl. D10-7.000.

Becker, Julius C., to Becker Manufacturing Company, Incorporated. Animal feeder. 245,714, 9-6-77, Cl. D30-13.000.

Becker Manufacturing Company, Incorporated: *See*—
Becker, Julius C., 245,714, Cl. D30-13.000.

Bogner, Richard D. Transmitting antenna. 245,693, 9-6-77, Cl. D14-86.000.

Bogner, Richard D. Transmitting antenna. 245,694, 9-6-77, Cl. D14-86.000.

Bowman, George E.: *See*—
Skyer, Robert A.; and Bowman, George E., 245,697, Cl. D15-30.000.
Skyer, Robert A.; and Bowman, George E., 245,698, Cl. D15-30.000.

Brett-Hauer Co., Inc.: *See*—
Bretthauer, Frank N., 245,668, Cl. D8-71.000.

Bretthauer, Frank N., to Brett-Hauer Co., Inc. Adjustable jig for portable power saws, routers and the like. 245,668, 9-6-77, Cl. D8-71.000.

Bridgestone Tire Company Limited: *See*—
Hakayawa, Toshio; Kojima, Hiroshi; and Yoshihara, Masafumi, 245,686, Cl. D12-143.000.

Calkins, James Stewart; and Nilsen, Alfred, to Dow Chemical Company, The. Can puncturing tool or similar article. 245,666, 9-6-77, Cl. D8-18.000.

Carpenter, Andrew John, to Darpex Manufacturing Company Limited. Note pad holder for a telephone or the like. 245,702, 9-6-77, Cl. D19-86.000.

Clapp, Edward H. Air brake. 245,688, 9-6-77, Cl. D12-179.000.

Clover, William M., Jr., to Kirstine/Hendricks. Vitamin dispenser. 245,670, 9-6-77, Cl. D9-216.000.

Cone, Richard E. Toy skunk. 245,722, 9-6-77, Cl. D34-15.00B.

Consumer Products Industries: *See*—
Gordon, Norman, 245,663, Cl. D7-136.000.

Continental Scale Corporation: *See*—
Kushmuk, Walter P., 245,675, Cl. D10-91.000.

Cournoyer, Bernard T.; Wright, David M.; and O'Toole, Jerome M., to Wright Line Inc. Magnetic disk holder. 245,727, 9-6-77, Cl. D87-1.00D.

Cragar Industries: *See*—
Simpson, Elwood J., 245,689, Cl. D12-181.000.

Crysdale, Donald T. Display bracket to be used with perforated supports or the like. 245,652, 9-6-77, Cl. D6-114.000.

Dackeryd, Martin Gustav. Cheese-slicer. 245,661, 9-6-77, Cl. D7-43.000.

Dallaire, Raymond. Window component extrusion. 245,707, 9-6-77, Cl. D25-74.000.

Dallaire, Raymond. Window component extrusion. 245,708, 9-6-77, Cl. D25-74.000.

Dallaire, Raymond. Window component extrusion. 245,709, 9-6-77, Cl. D25-74.000.

Dallaire, Raymond. Window component extrusion. 245,710, 9-6-77, Cl. D25-74.000.

Dallaire, Raymond. Window component extrusion. 245,711, 9-6-77, Cl. D25-74.000.

Darpex Manufacturing Company Limited: *See*—
Carpenter, Andrew John, 245,702, Cl. D19-86.000.

Dart Industries Inc.: *See*—
Grusin, Gerald M., 245,658, Cl. D6-235.000.
Grusin, Gerald M., 245,659, Cl. D6-284.000.
Grusin, Gerald M., 245,660, Cl. D6-234.000.

Doray Industries: *See*—
Mueller, Ray E.; and Mueller, Dorothy M., 245,650, Cl. D6-23.000.

Dow Chemical Company, The: *See*—
Calkins, James Stewart; and Nilsen, Alfred, 245,666, Cl. D8-18.000.

Dunlop Limited: *See*—
Kawabata, Masahiro; and Kusube, Haruo, 245,687, Cl. D12-136.000.

Dyrup, Sven-Erik, to Trelleborgs Gummifabriks AB. Hose coupling. 245,704, 9-6-77, Cl. D23-44.000.

Egersdorf, Anton Tony. Combined auxiliary visor and clip. 245,690, 9-6-77, Cl. D12-191.000.

Eikosha Co., Ltd.: *See*—
Fukada, Rokuro, 245,705, Cl. D23-150.000.

Eldridge, Thomas M., Jr. Bird feeder. 245,715, 9-6-77, Cl. D30-14.000.

Farner, Ted L. Hydroponic growing system. 245,681, 9-6-77, Cl. D11-144.000.

Friedrich, Horst, to Milewski Moebelwerk Zeil KG. Paneling for a kitchen cabinet or similar article. 245,655, 9-6-77, Cl. D6-192.000.

Fukada, Rokuro, to Eikosha Co., Ltd. Fragrance-emitter housing. 245,705, 9-6-77, Cl. D23-150.000.

Gabourie, Gregory S., to Global Upholstery Company Limited. Base for a chair. 245,656, 9-6-77, Cl. D6-196.000.

Gadd, David W. Shoe. 245,647, 9-6-77, Cl. D2-275.000.

General Research of Electronics, Inc.: *See*—
Imazeki, Kazuyoshi, 245,692, Cl. D14-12.000.

Gerry, Martin E.: *See*—
Wotherspoon, John G., 245,712, Cl. D25-80.000.

Global Upholstery Company Limited: *See*—
Gabourie, Gregory S., 245,656, Cl. D6-196.000.

Gordon, Norman, to Consumer Products Industries. Burner heat distributor. 245,663, 9-6-77, Cl. D7-136.000.

Grandy, Andrew J. Advertising plaque. 245,730, 9-6-77, Cl. D96-12.00E.

Grantham, John P. Paint can accessory. 245,672, 9-6-77, Cl. D9-289.000.

Gripe, Thomas L. Symbolic no-smoking sign. 245,729, 9-6-77, Cl. D96-12.00E.

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Hasegawa, Satoshi. Piece for game. 245,719, 9-6-77, Cl. D34-5.0GP.

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Hughes Steel Products Pty. Ltd.: *See*—
Hughes, William Felix, 245,703, Cl. D23-4.000.

Hughes, William Felix, to Hughes Steel Products Pty. Ltd. Combined mixing and filter bowl. 245,703, 9-6-77, Cl. D23-4.000.

Hygena Limited: *See*—
Robinson, George Henry, 245,654, Cl. D6-167.000.

Imazeki, Kazuyoshi, to General Research of Electronics, Inc. Microphone. 245,692, 9-6-77, Cl. D14-12.000.

Ing. C. Olivetti & C., S.p.A.: *See*—
Sottsass, Ettore, 245,726, Cl. D64-11.00A.

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Skyer, Robert A.; and Bowman, George E., 245,697, Cl. D15-30.000.
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Jessie, John David. Game board. 245,717, 9-6-77, Cl. D34-5.0SS.

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Kent, Lucy E.: *See—*
Kent, Lowell R.; and Kent, Lucy E., 245,653, Cl. D6-130.000.
Kinsinger, William C., to Qantix Corporation. Kaleidoscopic projector. 245,701, 9-6-77, Cl. D16-20.000.
Kirstine/Hendricks: *See—*
Clover, William M., Jr., 245,670, Cl. D9-216.000.
Klingensmith, William J. Carpet tool. 245,665, 9-6-77, Cl. D8-15.000.
Klitzner, William S. Charm. 245,680, 9-6-77, Cl. D11-83.000.
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Kojima, Hiroshi: *See—*
Hakayawa, Toshio; Kojima, Hiroshi; and Yoshihara, Masafumi, 245,686, Cl. D12-143.000.
Kushmuk, Walter P., to Continental Scale Corporation. Weighing scale. 245,675, 9-6-77, Cl. D10-91.000.
Kusube, Haruo: *See—*
Kawabata, Masahiro; and Kusube, Haruo, 245,687, Cl. D12-136.000.
Land, Elvert H., Jr. Helmet face shield mounting bracket. 245,646, 9-6-77, Cl. D2-232.000.
Lawrence, William James: *See—*
Sulek, Eugene Joseph; and Lawrence, William James, 245,674, Cl. D10-38.000.
Lewis, Frank H. Ice tray cover. 245,699, 9-6-77, Cl. D15-90.000.
Malhoit, Edward C., to Xerox Corporation. Wire cutter. 245,667, 9-6-77, Cl. D8-52.000.
Maloney, William J., II, to Quaker Oats Company, The. Hockey game board. 245,718, 9-6-77, Cl. D34-5.0SS.
McAllister, Wayne D. Movie viewing booth. 245,706, 9-6-77, Cl. D25-16.000.
Medeiros, John V. Automobile safety signal. 245,678, 9-6-77, Cl. D10-109.000.
Milewski Moebelwerk Zeil KG: *See—*
Friedrich, Horst, 245,655, Cl. D6-192.000.
Mueller, Dorothy M.: *See—*
Mueller, Ray E.; and Mueller, Dorothy M., 245,650, Cl. D6-23.000.
Mueller, Ray E.; and Mueller, Dorothy M., to Doray Industries. Earring holder. 245,650, 9-6-77, Cl. D6-23.000.
Nilsen, Alfred: *See—*
Calkins, James Stewart; and Nilsen, Alfred, 245,666, Cl. D8-18.000.
O'Toole, Jerome M.: *See—*
Cournoyer, Bernard T.; Wright, David M.; and O'Toole, Jerome M., 245,727, Cl. D87-1.00D.
Owens-Illinois, Inc.: *See—*
Strand, Gordon A., 245,671, Cl. D9-269.000.
Ozimec, Stephen. Tray for quartz crystals. 245,700, 9-6-77, Cl. D15-140.000.
Parkison, Rodney Keith. Cross. 245,679, 9-6-77, Cl. D11-81.000.
Qantix Corporation: *See—*
Kinsinger, William C., 245,701, Cl. D16-20.000.
Quaker Oats Company, The: *See—*
Maloney, William J., II, 245,718, Cl. D34-5.0SS.
Rials, Elbert O. Pocket insertable towel carrier. 245,728, 9-6-77, Cl. D87-1.00R.
Robinson, George Henry, to Hygena Limited. Kitchen cabinet. 245,654, 9-6-77, Cl. D6-167.000.
Romero, Eli. Golf club head or similar article. 245,720, 9-6-77, Cl. D34-5.0GH.
Rumbaugh, Garry. Float toy for water associated recreational activities. 245,723, 9-6-77, Cl. D34-41.000.
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Skyer, Robert A.; and Bowman, George E., to International Harvester Company. Tractor cab. 245,697, 9-6-77, Cl. D15-30.000.
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Hackett, Kenneth R., 245,677, Cl. D10-106.000.
Sottsass, Ettore, to Ing. C. Olivetti & C., S.p.A. Carbon ribbon cartridge. 245,726, 9-6-77, Cl. D64-11.00A.
Squier, Gary L. Live poultry mover. 245,685, 9-6-77, Cl. D12-58.000.
Stelling, Geoffrey H. Banjo resonator flange. 245,725, 9-6-77, Cl. D56-1.00A.
Strand, Gordon A., to Owens-Illinois, Inc. Bottle closure. 245,671, 9-6-77, Cl. D9-269.000.
Sulek, Eugene Joseph; and Lawrence, William James, to Texas Instruments Inc. Wrist watch. 245,674, 9-6-77, Cl. D10-38.000.
Taylor, Harold L. Boot jack. 245,648, 9-6-77, Cl. D2-378.200.
Texas Instruments Inc.: *See—*
Sulek, Eugene Joseph; and Lawrence, William James, 245,674, Cl. D10-38.000.
Thomas, Richard R. Avocado seed starter cup. 245,682, 9-6-77, Cl. D11-152.000.
Thomas, Richard R. Avocado seed starter cup. 245,683, 9-6-77, Cl. D11-152.000.
Trelleborgs Gummifabriks AB: *See—*
Dyrup, Sven-Erik, 245,704, Cl. D23-44.000.
Varta Batteries Ltd.: *See—*
White, Philip, 245,691, Cl. D13-10.000.
Watts, Clifford V., to Watts Plow Company of Oregon, Inc. Hydraulic reset ground ripper implement. 245,695, 9-6-77, Cl. D15-11.000.
Watts, Clifford V., to Watts Plow Company of Oregon, Inc. Ground ripper tooth. 245,696, 9-6-77, Cl. D15-29.000.
Watts Plow Company of Oregon, Inc.: *See—*
Watts, Clifford V., 245,695, Cl. D15-11.000.
Watts, Clifford V., 245,696, Cl. D15-29.000.
Welton, Gerry D. Sling chair body. 245,657, 9-6-77, Cl. D6-197.000.
White, Philip, to Varta Batteries Ltd. Storage battery gang vent cap. 245,691, 9-6-77, Cl. D13-10.000.
Woods, Robert L. Pulley. 245,669, 9-6-77, Cl. D8-360.000.
Wotherspoon, John G., to Gerry, Martin E., a part interest. Roofing tile. 245,712, 9-6-77, Cl. D25-80.000.
Wright, David M.: *See—*
Cournoyer, Bernard T.; Wright, David M.; and O'Toole, Jerome M., 245,727, Cl. D87-1.00D.
Wright Line Inc.: *See—*
Cournoyer, Bernard T.; Wright, David M.; and O'Toole, Jerome M., 245,727, Cl. D87-1.00D.
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Malhoit, Edward C., 245,667, Cl. D8-52.000.
Yoshihara, Masafumi: *See—*
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CLASSIFICATION OF PATENTS

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NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

163 4,045,824

CLASS 3

1.91 4,045,825
4,045,826

CLASS 4

3 4,045,827
110 4,045,828

CLASS 5

18 R 4,045,829
81 R 4,045,830
334 C 4,045,832
334 R 4,045,831
335 4,045,833

CLASS 8

1 E 4,046,501
7 4,046,502
10.2 4,046,503
17 4,046,504
18 R 4,046,505
21 R 4,046,506
79 4,046,507

CLASS 9

7 4,045,834
313 4,045,835

CLASS 15

4 4,045,836
104.04 4,045,837
250.36 4,045,838
302 4,045,839
397 4,045,840

CLASS 16

114 R 4,045,842
129 4,045,841

CLASS 21

77 4,046,508

CLASS 23

230 A 4,046,509
230 R 4,046,510
253 TP 4,046,512
4,046,513
4,046,514
259 4,046,511
4,046,515
288 E 4,046,516

CLASS 24

16 PB 4,045,843
81 DM 4,045,844
205.11 F 4,045,845
205.16 C 4,045,846

CLASS 28

101 4,045,847
218 4,045,848

CLASS 29

25.13 4,045,849
111 4,045,850
157 R 4,045,851
159.02 4,045,852
163.5 F 4,045,853
235 4,045,854
252 4,045,855
262 4,045,856
420 4,045,857
427 4,045,858
451 4,045,859
4,045,860
454 4,045,861
570 4,045,862
588 4,045,863
603 4,045,864
611 4,045,865
623.1 4,046,062
628 4,045,866
4,045,867
629 4,045,868
630 A 4,045,869
741 4,045,870

CLASS 32

14 E 4,045,871
32 4,045,872
4,045,873
40 R 4,045,874

CLASS 33

30 D 4,045,875
126.6 4,045,876
178 R 4,045,877

CLASS 34

26 4,045,878
31 4,045,879
93 4,045,880
138 4,045,881
171 4,045,882

CLASS 35

28 4,045,883
35 R 4,045,884
42.5 4,045,885

CLASS 36

44 4,045,886
114 4,045,888
122 4,045,889
132 4,045,890

CLASS 37

2 R 4,045,891
50 4,045,892
108 A 4,045,893

CLASS 38

77.83 4,045,894

CLASS 40

28 C 4,045,895
106.1 4,045,896
125 A 4,045,897
156 4,045,898
322 4,045,899

CLASS 42

1 R 4,045,900

CLASS 43

9 4,045,901
22 4,045,902
42.11 4,045,903
53.5 4,045,904
88 4,045,905

CLASS 44

10 B 4,046,518
51 4,046,519
56 4,046,520
62 4,046,521

CLASS 46

44 4,045,906
93 4,045,907
204 4,045,908

CLASS 47

1.2 4,045,909
2 4,045,910
39 4,045,911
58 4,045,912

CLASS 48

102 A 4,046,522
197 R 4,046,523

CLASS 49

307 4,045,913
334 4,045,914

CLASS 51

123 G 4,045,916
4,045,917
164 4,045,918
165.77 4,045,919
165.88 4,045,920
306 4,046,524
427 4,045,915

CLASS 52

2 4,045,925
9 4,045,921
94 4,045,922
118 4,045,923
125 4,045,924
127 4,045,926
4,045,927
199 4,045,928
224 4,045,929
232 4,045,930
406 4,045,931
460 4,045,932
475 4,045,933
514 4,045,934
599 4,045,935
632 4,045,936
745 4,045,937

CLASS 53

22 A 4,045,939
22 R 4,045,938
26 4,045,940
35 4,045,941
48 4,045,942
112 A 4,045,943
123 4,045,944
167 4,045,945
180 M 4,045,946

CLASS 55

59 4,046,525
96 4,046,526
100 4,046,527
160 4,046,528
179 4,046,529
181 4,046,530

CLASS 56

343 4,045,947

CLASS 57

129 4,045,948
140 BY 4,045,949
140 R Re.29,382

CLASS 58

23 D 4,045,950
23 R 4,045,951
4,045,952
4,045,953
38 R 4,045,954

CLASS 60

39.28 R 4,045,955
39.65 4,045,956
262 4,045,957
325 4,045,958
521 4,045,978
632 4,045,959
648 4,045,960
686 4,045,961

CLASS 61

1 F 4,045,962
.5 4,045,963
11 4,045,964
39 4,045,965
53.64 4,045,966
86 4,045,967
4,045,968
535 4,045,969

CLASS 62

95 4,045,970
140 4,045,971
156 4,045,972
158 4,045,973
196 B 4,045,974
4,045,975
202 4,046,531
215 4,046,532
308 4,045,976
324 4,045,977
352 4,045,979
468 4,046,533
534 4,046,534

CLASS 64

23 4,045,980

CLASS 65

1 4,046,535
2 4,046,536
4,046,537
4 A 4,046,538
6 4,046,539
18 4,046,540
19 4,046,541
4,046,542
25 A 4,046,543
27 4,046,544
30 R 4,046,545
135 4,046,546
4,046,547
142 4,046,548
182 R 4,046,549
229 4,046,550

CLASS 66

147 4,045,981

CLASS 70

90 4,045,982
404 4,045,983
456 R 4,045,984

CLASS 71

10 4,046,551
92 4,046,552
94 4,046,553
118 4,046,554

CLASS 72

56 4,045,985
60 4,045,986
84 4,045,987
108 4,045,988
133 4,045,989
190 4,045,990
251 4,045,991
279 4,045,992
387 4,045,993
391 4,045,994
450 4,045,995

CLASS 73

1 R 4,045,996
23 4,045,997
23.1 4,045,998
59 4,045,999
95 4,046,000
100 4,046,001
116 4,046,002
118 4,046,003
119 A 4,046,004
133 R 4,046,005
151 4,046,006
188 4,046,007
349 4,046,008
359 R 4,046,009
406 4,046,010
421 B 4,046,011
421.5 R 4,046,012
4,046,014
4,046,015
422 R 4,046,013
425.4 R 4,046,016
462 4,046,017
482 4,046,018

CLASS 74

29 4,046,019
70 4,046,020
110 4,046,021
220 4,046,022
242.8 4,046,023
493 4,046,024
501 R 4,046,025
519 4,046,026
567 4,046,027
597 4,046,028
687 4,046,029
710 4,046,030
764 4,046,031
865 4,046,032
869 4,046,033

CLASS 75

35 4,046,555
4,046,556
4,046,557
68 A 4,046,558
93 R 4,046,559
170 4,046,560
172 R 4,046,561

CLASS 81

165 4,046,034

CLASS 82

1 C 4,046,035
2.7 4,046,036
35 4,046,037
47 4,046,038

CLASS 83

13 4,046,039
63 4,046,040
210 4,046,041
418 4,046,042
425.4 4,046,043
489 4,046,044
620 4,046,045
745 4,046,046

CLASS 84

1.01 4,046,047
1.03 4,046,048
1.11 4,046,049
304 4,046,050

CLASS 85

47 4,046,051
61 4,046,052
72 4,046,053
74 4,046,054

CLASS 86

1 B 4,046,055

CLASS 89

12 4,046,056

CLASS 90

14 4,046,057

CLASS 91

32 4,046,058
388 4,046,059
414 4,046,060
459 4,046,061

CLASS 93

1 C 4,046,063
4,046,064
35 SB 4,046,065

CLASS 96

1.5 R 4,046,562
4,046,563
4,046,564
4,046,565
7 4,046,566
27 R 4,046,567
29 R 4,046,568
48 PD 4,046,569
61 R 4,046,570
66 HD 4,046,571
69 4,046,572
74 4,046,573
99 4,046,574
100 N 4,046,575
108 4,046,576
115 R 4,046,577

CLASS 99

323.7 4,046,066
543 4,046,067

CLASS 100

65 4,046,068
255 4,046,069

CLASS 101

216 4,046,070
395 4,046,071
415.1 4,046,072
426 4,046,073
4,046,074

CLASS 102

37.8 4,046,075
70.2 A 4,046,076

CLASS 104

2 4,046,077
7 R 4,046,078
4,046,079

CLASS 105

133 4,046,080
326 4,046,081
377 4,046,082

CLASS 106

35 4,046,578
38.8 4,046,579
50 Re.29,388
55 4,046,580
85 4,046,581
88 4,046,582
90 4,046,583
4,046,584
123 LC 4,046,585
194 4,046,586
271 4,046,587
298 4,046,588
299 4,046,589

CLASS 108

107 4,046,083
112 4,046,084

CLASS 110

12 4,046,085
4,046,086

CLASS 112

121.15 4,046,087
265 4,046,088
4,046,089

CLASS 113

1 K 4,046,090

CLASS 114

39 4,046,091
56 4,046,092
165 4,046,093
222 4,046,094
4,046,095

CLASS 115

35 4,046,096
42 4,046,097

CLASS 116

56 4,046,098

CLASS 118

6 4,046,099
8 4,046,100
49.1 4,046,101
78 4,046,102
125 4,046,103
300 4,046,104
429 4,046,105
620 4,046,106

CLASS 119

17 4,046,107
18 4,046,108
92 4,046,109

CLASS 122

32 4,046,110

CLASS 123

32 EA 4,046,113
4,046,129
32 JV 4,046,112
32 SP 4,046,111
41.76 4,046,114
46 R 4,046,115
48 R 4,046,116
103 C 4,046,117
119 A 4,046,119
119 EC 4,046,118
120 4,046,120
139 AW 4,046,121
4,046,122
146.5 A 4,046,123
148 A 4,046,127
148 DS 4,046,126
148 E 4,046,124
4,046,125
195 C 4,046,128

CLASS 124

28 4,046,130
71 4,046,131

CLASS 126

9 R 4,046,132
270 4,046,133
4,046,134
271 4,046,135
4,046,136

CLASS 127

46 B 4,046,590

CLASS 128

1 D 4,046,137
2 F 4,046,138
2 H 4,046,139
2 R 4,046,140
2.1 R 4,046,141
55 4,046,142

133 4,046,143
214.4 4,046,144
215 4,046,145
266 4,046,146
290 R 4,046,147
303.1 4,046,148
328 4,046,149
4,046,150
404 4,046,151

CLASS 131

170 R 4,046,152
187 4,046,153

CLASS 134

1 4,046,591
4,046,592
21 4,046,593
65 4,046,154
167 R 4,046,155

CLASS 136

89 SJ 4,046,594

CLASS 137

14 Re.29,383
68 A 4,046,156
74 4,046,157
88 4,046,158
112 4,046,159
115 4,046,160
247.17 4,046,161
489 4,046,162
512.3 4,046,163
514.7 4,046,164
624.27 4,046,165
625.48 4,046,166

CLASS 138

31 4,046,167
89 4,046,168
106 4,046,169

CLASS 139

20 4,046,170
29 4,046,171
33 4,046,172
48 4,046,173
437 4,046,174

CLASS 140

92.1 4,046,175
4,046,176
147 4,046,177

CLASS 141

1 4,046,178
10 Re.29,384

CLASS 144

34 E 4,046,179
117 B 4,046,180

CLASS 148

1.5 4,046,595
2 4,046,596
12 B 4,046,599
12 R 4,046,597
4,046,598
12.4 4,046,600
15 4,046,601
111 4,046,602
144 4,046,603
156 4,046,604
175 4,046,605
187 4,046,606
4,046,607
188 4,046,608
189 4,046,609

CLASS 151

41.73 4,046,181

CLASS 152

158 4,046,182
362 R 4,046,183
407 4,046,184

CLASS 156

73.1 4,046,610
79 4,046,611
205 4,046,612
249 4,046,613
353 4,046,614
544 4,046,615
559 4,046,616
601 4,046,617
603 4,046,618
645 4,046,619
666 4,046,620

CLASS 160

368 G 4,046,185
368 R 4,046,186

CLASS 162

40 4,046,621
132 4,046,622
306 4,046,623

CLASS 164

53 4,046,187
282 4,046,188

CLASS 165

39 4,046,189
105 4,046,190
4,046,193

CLASS 166

.5 4,046,191
.6 4,046,192
248 4,046,194
272 4,046,195
273 4,046,196
278 4,046,198
303 4,046,199
305 R 4,046,197

CLASS 172

14 4,046,200
59 4,046,201
72 4,046,202
456 4,046,203

CLASS 174

72 A 4,046,957
73 R 4,046,958

CLASS 175

76 4,046,204
292 4,046,205
364 4,046,206
391 4,046,207

CLASS 176

22 4,046,624
24 4,046,625
38 4,046,626
4,046,627
4,046,628
4,046,629
39 4,046,630
79 4,046,631
87 4,046,632

CLASS 177

19 4,046,208

CLASS 178

68 4,046,959

CLASS 179

1 D 4,046,960
1 P 4,046,961
6.3 R 4,046,962
15 A 4,046,963
15 BF 4,046,964
18 BC 4,046,966
18 DA 4,046,965
18 FA 4,046,967
4,046,968
4,046,969
84 L 4,046,970
90 K 4,046,971
99 4,046,972
100.11 4,046,973
111 R 4,046,974

CLASS 180

9.52 4,046,209
24.1 4,046,210
41 4,046,211
44 R 4,046,212
105 E 4,046,213
109 4,046,214
116 4,046,215
126 4,046,217
127 4,046,216
155 4,046,218

CLASS 181

105 4,046,220
211 4,046,219

CLASS 182

155 4,046,221

CLASS 184

6.11 4,046,222
4,046,223
15 R 4,046,224
4,046,225

CLASS 187

12 4,046,226
29 R 4,046,227
4,046,228
4,046,229

CLASS 188

1 B 4,046,230
71.1 4,046,231
73.1 4,046,232
73.3 4,046,233
4,046,234
134 4,046,235

CLASS 192

8 R 4,046,236
13 R 4,046,237
45 4,046,238
58 B 4,046,239
104 C 4,046,240
150 4,046,241

CLASS 194

4 R 4,046,242
10 4,046,243

CLASS 195

63 4,046,636
103.5 R 4,046,633
4,046,634
103.7 4,046,635

CLASS 197

1 R 4,046,244
60 4,046,245
160 4,046,246
168 4,046,247

CLASS 198

583 4,046,248
758 4,046,249

CLASS 200

5 A 4,046,975
61.93 4,046,976
84 C 4,046,977
148 A 4,046,978
4,046,979
153 LA 4,046,980
159 B 4,046,981
159 R 4,046,982

CLASS 202

174 4,046,637

CLASS 203

1 4,046,638
11 4,046,639
4,046,640
39 4,046,641

CLASS 204

2.1 4,046,642
10 4,046,643
37 R 4,046,644
4,046,645
38 B 4,046,646
43 T 4,046,647
55 R 4,046,648
58 4,046,649
67 4,046,650
73 R 4,046,651
78 4,046,652
95 4,046,653
99 4,046,654
149 4,046,655
158 HA 4,046,656
180 R 4,046,657
181 4,046,658
192 C 4,046,659
4,046,660
195 S 4,046,661
275 4,046,662
280 4,046,663
4,046,664
282 4,046,665
298 4,046,666
299 R 4,046,667

CLASS 206

1.7 4,046,250
45.14 4,046,251
95 4,046,252
278 4,046,253
370 4,046,254
387 4,046,255
497 4,046,256
544 4,046,257
611 4,046,313

CLASS 208

11 LE 4,046,668
4,046,669
48 AA 4,046,670
138 4,046,671
139 4,046,672
140 4,046,673
251 H 4,046,674
321 4,046,675
4,046,676

CLASS 209

111.5 4,046,258
111.7 R 4,046,259
166 4,046,677
4,046,678
212 4,046,679
214 4,046,680
224 4,046,681
250 4,046,682

CLASS 210

20 4,046,683
4,046,684
23 H 4,046,685
4,046,686
32 4,046,687
37 R 4,046,688
59 4,046,689
75 4,046,690
83 4,046,691
108 4,046,692
195 S 4,046,693
297 4,046,694
340 4,046,695
431 4,046,696
457 4,046,697
513 4,046,698
516 4,046,699
523 4,046,700

CLASS 211

24 4,046,260
41 4,046,261

CLASS 214

1 BC 4,046,263
1 CM 4,046,262
8 4,046,264
14 4,046,265
4,046,266
16.4 B 4,046,267
58 4,046,268
83.3 4,046,269
138 R 4,046,270
152 4,046,271
312 4,046,272
450 4,046,273
506 4,046,274

CLASS 215

1 C 4,046,275
250 4,046,276

CLASS 219

10.55 D 4,046,983
69 E 4,046,984
121 L 4,046,985
121 LM 4,046,986
135 4,046,987
137 R 4,046,988
437 4,046,989
471 4,046,990
497 4,046,991

CLASS 220

1.5 4,046,277
4,046,278
8 4,046,279
89 A 4,046,280
270 4,046,282
4,046,283

CLASS 221

45 4,046,284
157 4,046,285
251 4,046,286

CLASS 222

1 Re.29,385
16 4,046,287
135 4,046,288
146 HE 4,046,289
267 4,046,290
309 4,046,291
383 4,046,292
404 Re.29,386

CLASS 223

88 4,046,293

CLASS 224

5 H 4,046,294
4,046,295
26 D 4,046,296
42.03 B 4,046,297

CLASS 225

2 4,046,298
3 4,046,299
103 4,046,300

CLASS 228

108 4,046,301
121 4,046,302
173 4,046,303
187 4,046,304
194 4,046,305

CLASS 229

5.7 4,046,306
15 4,046,307
17 R 4,046,308
23 R 4,046,309
30 4,046,310
40 4,046,311
45 R 4,046,312
52 AW 4,046,314

CLASS 233

4 4,046,315
23 R 4,046,316
4,046,317

CLASS 235

54 F 4,046,992
61.11 A 4,046,994
61.5 D 4,046,993
61.6 R 4,046,995
92 PK 4,046,996
150.21 4,046,998
150.5 4,046,997
150.53 4,046,999
151.1 4,047,000
151.11 4,047,003
151.12 4,047,004
151.21 4,047,005
151.3 4,047,001
4,047,002
151.33 4,047,006
4,047,007
152 4,047,008
4,047,009
156 4,047,010
4,047,012
4,047,013
164 4,047,011
189 4,047,014

CLASS 236

1 G 4,046,318
34.5 4,046,319

CLASS 237

8 C 4,046,320

CLASS 239

420 4,046,321
533.7 4,046,322

CLASS 240

1.3 4,047,015
4 4,047,016
6.46 4,047,017
7.1 R 4,047,018
8.2 4,047,019
46.59 4,047,020
78 E 4,047,021

CLASS 241

23 4,046,323
46.06 4,046,324
73 4,046,325
182 4,046,326
197 4,046,327

CLASS 242

18 A 4,046,328
18 G 4,046,329
4,046,330
54 R 4,046,331
107.4 A 4,046,332
137.1 4,046,333
201 4,046,334

CLASS 244

17.19 4,046,335
96 4,046,337
103 R 4,046,339
153 R 4,046,340
181 4,046,341
198 4,046,336
213 4,046,338

CLASS 246

34 R 4,046,342

CLASS 248

49 4,046,343
72 4,046,344
154 4,046,345
298 4,046,346
346 4,046,347
423 4,046,348
424 4,046,349

CLASS 250

201 4,047,022
214 B 4,047,023
231 SE 4,047,024
237 G 4,047,025
251 4,047,026
262 4,046,764
264 4,047,027
266 4,047,028
273 4,047,029
281 4,047,030
335 4,047,031
338 4,047,032
341 4,047,033
354 4,047,034
355 4,047,035
359 4,047,036
370 4,047,037
372 4,047,038
385 4,047,039
4,047,040
4,047,041
390 4,047,042
401 4,047,043
402 4,047,044
551 4,047,045

CLASS 251

58 4,046,350
129 4,046,351

CLASS 252

8.1 4,046,701
33.4 4,046,702
59 4,046,703
63.2 4,046,704
99 4,046,705
106 4,046,706
180 4,046,707
299 4,046,708
421 4,046,709
429 B 4,046,710
441 4,046,711
447 4,046,712
455 R 4,046,714
455 Z 4,046,713
466 B 4,046,715
522 4,046,716
546 4,046,717

CLASS 254

29 R 4,046,352
83 4,046,353
93 R 4,046,354
173 R 4,046,355

CLASS 256

10 4,046,356

CLASS 259

6 Re.29,387
147 4,046,357
4,046,358
193 4,046,359

CLASS 260

2 R 4,046,718
2.5 AW 4,046,721
2.5 B 4,046,720
2.5 FP 4,046,719
6 4,046,722
8 4,046,723
9 4,046,724
4,046,725
27 R 4,046,72(
28.5 A 4,046,72(
28.5 R 4,046,72(
29.2 TN 4,046,729
29.6 RB 4,046,730
30.6 R 4,046,731
31.2 R 4,046,732
33.6 EP 4,046,733
38 4,046,734
45.8 N 4,046,736
4,046,737
45.8 NT 4,046,735
67 FP 4,046,738
75 M 4,046,739
75 N 4,046,740
77.5 A 4,046,741
77.5 AB 4,046,743
77.5 AN 4,046,742
77.5 AQ 4,046,744
77.5 CR 4,046,745
78 S 4,046,746
4,046,747
78 UA 4,046,748
79 4,046,749
112.5 R 4,046,751
158 4,046,752
4,046,753
162 4,046,754
174 4,046,755
205 4,046,756
207 4,046,757
239 E 4,046,758
239.1 4,046,759
239.55 R 4,046,760
250 B 4,046,763
288 CE 4,046,765
290 HL 4,046,766
293.77 4,046,767
294.8 D 4,046,768
295 T 4,046,769
305 4,046,770
307 D 4,046,771
308 R 4,046,772
315 4,046,774
326.14 R 4,046,776
326.2 4,046,775
326.26 4,046,777
326.34 4,046,778
346.22 4,046,779
346.4 4,046,780
347.7 4,046,781
348.29 4,046,784
348.32 4,046,782

348.33 4,046,783
380 4,046,785
396 N 4,046,786
399 4,046,787
404 4,046,788
412.8 4,046,789
429.5 4,046,790
429.7 4,046,791
4,046,792
439 R 4,046,793
448 A Re.29,389
448.2 E 4,046,795
448.2 N 4,046,794
453 P 4,046,796
453 R 4,046,797
465 D 4,046,798
4,046,799
465 E 4,046,800
501.21 4,046,804
506 4,046,805
512 C 4,046,806
549 4,046,807
553 A 4,046,808
570.9 4,046,809
571 4,046,810
578 4,046,811
583 B 4,046,812
586 P 4,046,813
590 E 4,046,814
606.5 B 4,046,815
613 R 4,046,816
621 R 4,046,817
627 G 4,046,818
648 R 4,046,819
652.5 R 4,046,820
654 A 4,046,821
659 A 4,046,822
662 R 4,046,823
667 4,046,824
668 R 4,046,825
671 C 4,046,826
672 T 4,046,827
673.5 4,046,828
676 R 4,046,829
4,046,830
4,046,831
683 D 4,046,832
683.3 4,046,833
752 4,046,834
857 PA 4,046,835
860 4,046,836
873 4,046,837
876 B 4,046,838
880 R 4,046,839
897 A 4,046,840
923 4,046,841

CLASS 261

34 A 4,046,844
122 4,046,845

CLASS 264

22 4,046,842
4,046,843
45.3 4,046,846
61 4,046,847
70 4,046,848
174 4,046,849
216 4,046,850

CLASS 267

65 B 4,046,360
139 4,046,361

CLASS 269

43 4,046,362
228 4,046,363
244 4,046,364
328 4,046,365

CLASS 270

21 4,046,366
55 4,046,367
61 R 4,046,368

CLASS 271

3.1 4,046,369
4,046,370
178 4,046,371
273 4,046,372

CLASS 272

63 4,046,373
70.3 4,046,374
85 4,046,375

CLASS 273

54 D 4,046,376
73 G 4,046,377
85 D 4,046,378
95 AA 4,046,379
119 R 4,046,380
134 AD 4,046,381
135 B 4,046,382
148 R 4,046,383

CLASS 274

10 R 4,046,385
23 A 4,046,386
47 4,046,384

CLASS 277

2 4,046,387
53 4,046,388
113 4,046,389

CLASS 279

1 S 4,046,390

CLASS 280

5.24 4,046,391
8 4,046,392
19 4,046,393
33.99 B 4,046,394
106.5 R 4,046,395
281 R 4,046,396
289 R 4,046,397
415 R 4,046,398
420 4,046,399
626 4,046,400
650 4,046,401
674 4,046,402
701 4,046,403

CLASS 282

27.5 4,046,404

CLASS 285

3 4,046,405
47 4,046,406
133 R 4,046,407
188 4,046,408
305 4,046,409

CLASS 292

36 4,046,410
200 4,046,412

CLASS 293

19 4,046,411
88 4,046,411

CLASS 294

19 A 4,046,413
81 R 4,046,414

CLASS 296

35 R 4,046,415
98 4,046,416

CLASS 297

16 4,046,417
118 4,046,418
153 4,046,419
216 4,046,420
232 4,046,421
248 4,046,422

CLASS 298

22 D 4,046,423

CLASS 299

56 4,046,424

CLASS 301

12 R 4,046,425

CLASS 303

100 4,046,426
115 4,046,427

CLASS 305

11 4,046,428
35 EB 4,046,429

CLASS 307

101 4,047,046
106 4,047,047
108 4,047,050
118 4,047,048
157 4,047,049
221 D 4,047,051
228 4,047,052
238 4,047,053
252 J 4,047,054
262 4,047,055
271 4,047,056
273 4,047,057
293 4,047,058
355 4,047,059

CLASS 308

26 4,046,430
76 4,046,431
189 R 4,046,432
191 4,046,433
195 4,046,434
4,046,435
233 4,046,436

CLASS 310

164 4,047,061
216 4,047,062
232 4,047,063
322 4,047,060

CLASS 312

20 4,046,437
138 A 4,046,438
138 R 4,046,439
215 4,046,440

CLASS 313

201 4,047,064
4,047,065
217 4,047,066
221 4,047,067
293 Re.29,390
359 4,047,068
388 4,047,070
487 4,047,069
490 4,047,071
496 4,047,072
497 4,047,073
4,047,074
500 4,047,075

CLASS 315

88 4,047,076
169 TV 4,047,077
411 4,047,078

CLASS 318

79 4,047,080
138 4,047,081
221 E 4,047,082
231 4,047,083
254 4,047,084
601 4,047,085
608 4,047,086
661 4,047,087

CLASS 320

6 4,047,088

CLASS 321

15 4,047,091

CLASS 322

2 R 4,047,093
7 4,047,094
17 4,047,095

CLASS 323

19 4,047,096
119 4,047,097

CLASS 324

6 4,047,098
30 B 4,047,100
30 R 4,047,099
33 4,047,101
4,047,102
34 D 4,047,103
62 4,047,104
65 R 4,047,105
175 4,047,106

CLASS 325

37 4,047,107
38 B 4,047,108
54 4,047,109
123 4,047,110
315 4,047,111
455 4,047,112

CLASS 328

2 4,047,113
140 4,047,114
151 4,047,115

CLASS 329

124 4,047,116

CLASS 330

4.3 4,047,117
22 4,047,118
30 D 4,047,119
84 4,047,122
207 P 4,047,120

CLASS 331

76 4,047,121
94.5 H 4,047,123
4,047,124
94.5 PE 4,047,125
96 4,047,126

CLASS 332

31 T 4,047,127

CLASS 333

11 4,047,128
72 4,047,129
4,047,130
81 R 4,047,131
84 M 4,047,132
95 A 4,047,133

CLASS 335

23 4,047,134
58 4,047,135
222 4,047,136
234 4,047,137

CLASS 336

100 4,047,138
150 4,047,139

CLASS 337

28 Re.29,391
75 4,047,140
89 4,047,141
186 4,047,142
239 4,047,143

CLASS 338

2 4,047,144
67 4,047,145
176 4,047,146

CLASS 339

8 R 4,046,441
17 CF 4,046,442
66 M 4,046,443
91 R 4,046,444
95 D 4,046,445
99 R 4,046,446
103 M 4,046,447
126 R 4,046,449
153 4,046,448
177 R 4,046,451
198 H 4,046,452
217 S 4,046,450

CLASS 340

3 R 4,047,147
12 R 4,047,148
52 B 4,047,149
84 4,047,150
146.1 AX 4,047,151
146.3 AG 4,047,152
146.3 AQ 4,047,153
146.3 E 4,047,154
147 R 4,047,155
171 A 4,047,156
173 R 4,047,163
174 M 4,047,164
227 R 4,047,165
261 4,047,166
280 4,047,167
310 R 4,047,168
324 M 4,047,169

CLASS 343

5 PC 4,047,170
6.8 R 4,047,171
17.1 R 4,047,172
17.2 PC 4,047,173
18 B 4,047,174
100 CS 4,047,175
106 R 4,047,176
113 DE 4,047,177
750 4,047,178
768 4,047,179
784 4,047,180
789 4,047,181
904 4,047,182

CLASS 346

1 4,047,183
75 4,047,184
140 R 4,047,185
4,047,186

CLASS 350

96 C 4,046,453
4,046,454
150 4,046,455
160 R 4,046,456
164 4,046,457
178 4,046,458
214 4,046,459
216 4,046,460
287 4,046,461
295 4,046,462

CLASS 351

13 4,046,463

CLASS 352

141 4,046,464
175 4,046,465

CLASS 354

15 4,047,188
23 D 4,047,187
4,047,189
27 4,047,190
4,047,191
83 4,047,192
105 4,047,193
149 4,047,194
152 4,047,206
155 4,047,207
4,047,222
203 4,047,208
212 4,047,209
238 4,047,210
258 4,047,211
270 4,047,212
299 4,047,213

CLASS 355

3 R 4,046,466
4,046,467
4,046,468
13 4,046,469
4,046,470
14 4,046,471
4,046,472
16 4,046,473
43 4,046,474
69 4,046,475
77 4,046,476

CLASS 356

109 4,046,477

CLASS 357

3 4,047,199
23 4,047,214
24 4,047,215
4,047,216
34 4,047,217
4,047,218
38 4,047,219
48 4,047,220
55 4,047,195
4,047,196
81 4,047,197
82 4,047,198

CLASS 358

29 4,047,202
44 4,047,203
47 4,047,200
93 4,047,204
107 4,047,205
136 4,047,221
158 4,047,223
166 4,047,224
190 4,047,225
193 4,047,226
194 4,047,227
261 4,047,228

CLASS 360

2 4,047,229
17 4,047,230
36 4,047,231
113 4,047,236
134 4,047,232

CLASS 361

45 4,047,079
88 4,047,233
92 4,047,234
98 4,045,887
100 4,047,235
210 4,047,237
229 4,047,238
270 4,047,239
275 4,047,240
288 4,047,241
389 4,047,242

CLASS 363

34 4,047,090
49 4,047,089
135 4,047,092

CLASS 364

200 4,047,161
4,047,162
4,047,201
4,047,243
4,047,244
4,047,245
4,047,246
4,047,247
900 4,047,157
4,047,158
4,047,159
4,047,160
4,047,248

CLASS 403

262 4,046,478
306 4,046,479
320 4,046,481
398 4,046,480

CLASS 404

4 4,046,482
112 4,046,483
4,046,484
123 4,046,485

CLASS 416

157 R 4,046,486
208 4,046,487
210 R 4,046,488
223 R 4,046,489

CLASS 417

28 4,046,490
44 4,046,491
197 4,046,492
220 4,046,493
253 4,046,494
268 4,046,495

CLASS 423

41 4,046,851
58 4,046,852
77 4,046,853
4,046,854
130 4,046,855
166 4,046,856
239 4,046,888
300 4,046,857
305 4,046,858
328 4,046,859
341 4,046,860
367 4,046,861
383 4,046,862
448 4,046,863
450 4,046,864
499 4,046,865
533 4,046,866
543 4,046,867
588 4,046,868
652 4,046,869

CLASS 424

1 4,046,870
11 4,046,871
52 4,046,872
54 4,046,873
73 4,046,874
89 4,046,875
177 4,046,876
4,046,877
180 4,046,878
4,046,879
4,046,880
181 4,046,881
195 4,046,882
209 4,046,883
210 4,046,884
4,046,885
227 4,046,886
232 4,046,887
244 4,046,889
4,046,890
248.4 4,046,891
248.57 4,046,892
251 4,046,893
254 4,046,894
258 4,046,895
263 4,046,896
4,046,897
4,046,898
266 4,046,899
267 4,046,900
4,046,901
270 4,046,902
271 4,046,903
4,046,904
272 4,046,905
273 R 4,046,906
4,046,907
4,046,908
274 4,046,909
278 4,046,910
285 4,046,911
300 4,046,912
311 4,046,913
312 4,046,914
317 4,046,915
319 4,046,916
326 4,046,917
331 4,046,918
338 4,046,919

CLASS 425

222 4,046,496
313 4,046,497
405 H 4,046,499
407 4,046,500
526 4,046,498

CLASS 426

19 4,046,920
46 4,046,921
104 4,046,922
130 4,046,923
502 4,046,924
573 4,046,925
613 4,046,926

CLASS 427

2 4,046,927
12 4,046,928
164 4,046,929
387 4,046,930
428 4,046,931

CLASS 428

64 4,046,932
81 4,046,933
155 4,046,934
182 4,046,935
195 4,046,936
211 4,046,937
255 4,046,942
262 4,046,944
282 4,046,945
285 4,046,938
311 4,046,939
313 4,046,940
323 4,046,941
325 4,046,946
339 4,046,943
352 4,046,947
392 4,046,948
411 4,046,949
4,046,950
412 4,046,951
423 4,046,952
426 4,046,953
446 4,046,954
479 4,046,955

CLASS 429

20 4,046,956

CLASS 526

310 4,046,750

CLASS 544

17 4,046,761
148 4,046,762

CLASS 548

339 4,046,773

CLASS 560

61 G 4,046,802
121 4,046,801
172 4,046,803

CLASSIFICATION OF DESIGNS

D2—	232	245,646	D7—	43	245,661		67	245,676		181	245,689	D23—	4	245,703	D34—	5 GH	245,720
	275	245,647		45	245,662		91	245,675		191	245,690		44	245,704			245,721
	378.2	245,648		136	245,663		106	245,677	D13—	10	245,691		150	245,705		5 GP	245,719
	400	245,649	D8—	10	245,664		109	245,678	D14—	12	245,692	D25—	16	245,706		5 SS	245,717
D6—	23	245,650		15	245,665	D11—	81	245,679		86	245,693		74	245,707			245,718
	68	245,651		18	245,666		83	245,680			245,694			245,708		15 B	245,722
	114	245,652		52	245,667		144	245,681	D15—	11	245,695			245,709		41	245,723
	130	245,653		71	245,668		152	245,682		29	245,696			245,710	D48—	4 B	245,724
	167	245,654		360	245,669			245,683		30	245,697			245,711	D56—	1 A	245,725
	192	245,655	D9—	216	245,670		155	245,684			245,698		80	245,712	D64—	11 A	245,726
	196	245,656		269	245,671	D12—	58	245,685		90	245,699	D28—	64	245,713	D87—	1 D	245,727
	197	245,657		289	245,672		136	245,687		140	245,700	D30—	13	245,714		1 R	245,728
	234	245,660	D10—	7	245,673		143	245,686	D16—	20	245,701		14	245,715	D96—	12 E	245,729
	235	245,658		38	245,674		179	245,688	D19—	86	245,702		41	245,716			245,730
	284	245,659															

CLASSIFICATION OF PLANTS

P.—	70	4,099			4,100		73	4,098		88	4,097						

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

66—	195	T962,002	96—	110	T962,004	204—	159.23	T962,006	260—	624 C	T962,009	423—	307	T962,001			
71—	33	T962,003	156—	71	T962,005	252—	429 B	T962,007	261—	41 D	T962,010	428—	517	T962,011	528—	500	T962,008

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,045,858	4,046,131	4,046,801	4,046,967	4,046,651	4,046,579
	4,045,958	4,046,134	4,046,824	4,046,968	4,046,731	4,046,638
	4,046,617	4,046,139	4,046,860	4,046,969	4,046,748	4,046,639
	4,046,686	4,046,145	4,046,877	4,047,011	4,046,809	4,046,640
	4,047,001	4,046,156	4,046,925	4,047,106	4,047,008	4,046,672
	4,047,114	4,046,186	4,046,927	9 : 4,045,842	4,047,148	4,046,675
4 :	4,045,887	4,046,190	4,046,954	4,045,865	4,047,161	4,046,676
	4,045,922	4,046,199	4,046,960	4,045,894	4,047,226	4,046,711
	4,046,056	4,046,214	4,046,993	4,045,956	13 : 4,045,873	4,046,713
	4,046,061	4,046,235	4,047,002	4,045,957	4,046,000	4,046,714
	4,046,364	4,046,254	4,047,012	4,045,992	4,046,307	4,046,715
	4,046,643	4,046,256	4,047,017	4,046,003	4,046,358	4,046,726
	4,046,820	4,046,259	4,047,020	4,046,005	4,046,454	4,046,768
	4,046,995	4,046,262	4,047,023	4,046,008	17 : Re.29,387	4,046,779
	4,047,150	4,046,266	4,047,029	4,046,016	4,045,833	4,046,819
	4,047,171	4,046,277	4,047,049	4,046,351	4,045,853	4,046,828
	4,047,218	4,046,284	4,047,068	4,046,365	4,045,874	4,046,884
5 :	4,045,903	4,046,292	4,047,086	4,046,390	4,045,884	4,046,892
	4,046,017	4,046,314	4,047,091	4,046,430	4,045,896	4,046,922
	4,046,361	4,046,316	4,047,093	4,046,494	4,045,911	4,046,958
6 :	Re.29,383	4,046,317	4,047,099	4,046,529	4,045,972	4,046,962
	Re.29,391	4,046,324	4,047,100	4,046,625	4,045,989	4,047,003
	4,045,825	4,046,339	4,047,102	4,046,849	4,045,996	4,047,016
	4,045,826	4,046,376	4,047,117	4,046,852	4,046,009	4,047,019
	4,045,827	4,046,380	4,047,120	4,046,956	4,046,015	4,047,060
	4,045,832	4,046,395	4,047,121	4,046,997	4,046,018	4,047,078
	4,045,835	4,046,396	4,047,126	4,047,006	4,046,021	4,047,085
	4,045,861	4,046,442	4,047,127	4,047,007	4,046,029	4,047,104
	4,045,870	4,046,445	4,047,130	4,047,044	4,046,047	4,047,142
	4,045,872	4,046,462	4,047,144	4,047,053	4,046,048	4,047,223
	4,045,890	4,046,474	4,047,154	10 : 4,046,328	4,046,083	4,047,225
	4,045,897	4,046,479	4,047,158	4,046,567	4,046,104	4,047,227
	4,045,900	4,046,480	4,047,164	4,046,648	4,046,108	4,047,245
	4,045,906	4,046,508	4,047,166	4,046,728	4,046,138	18 : 4,045,834
	4,045,915	4,046,520	4,047,180	4,046,868	4,046,144	4,045,862
	4,045,940	4,046,533	4,047,181	11 : 4,046,007	4,046,148	4,045,882
	4,045,967	4,046,534	4,047,195	4,046,417	4,046,160	4,045,980
	4,045,968	4,046,584	4,047,198	4,046,518	4,046,203	4,046,038
	4,045,982	4,046,590	4,047,204	12 : 4,045,856	4,046,236	4,046,062
	4,045,983	4,046,605	4,047,207	4,045,885	4,046,247	4,046,075
	4,046,010	4,046,613	4,047,216	4,046,052	4,046,252	4,046,081
	4,046,045	4,046,636	4,047,217	4,046,119	4,046,267	4,046,082
	4,046,050	4,046,659	4,047,222	4,046,125	4,046,283	4,046,167
	4,046,054	4,046,669	4,047,231	4,046,171	4,046,297	4,046,261
	4,046,066	4,046,674	4,047,248	4,046,193	4,046,306	4,046,268
	4,046,067	4,046,685	8 : 4,046,097	4,046,221	4,046,344	4,046,384
	4,046,072	4,046,696	4,046,150	4,046,288	4,046,348	4,046,491
	4,046,076	4,046,702	4,046,301	4,046,295	4,046,366	4,046,514
	4,046,091	4,046,706	4,046,321	4,046,382	4,046,436	4,046,551
	4,046,093	4,046,720	4,046,398	4,046,418	4,046,451	4,046,770
	4,046,105	4,046,741	4,046,407	4,046,483	4,046,516	4,046,817
	4,046,117	4,046,750	4,046,471	4,046,484	4,046,554	4,046,874
	4,046,124	4,046,758	4,046,495	4,046,485	4,046,577	4,046,891

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22 : Re.29,384
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25 : 4,045,838
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37 : 4,046,163
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39 : 4,045,839
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46 : 4,046,337
47 : 4,045,973
4,046,143
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4,046,690
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4,047,096
48 : 4,045,859
4,045,868
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4,046,194
4,046,196
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4,047,155
4,047,163
4,047,167
4,047,215
49 : 4,045,828
4,046,211
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4,046,985
51 : 4,045,949
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54 : 4,046,424
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56 : 4,046,246

DESIGN PATENTS

1 :	245,713		245,725		245,663	26 :	245,666		245,699		245,696
4 :	245,649	8 :	245,677		245,675		245,724		245,701	42 :	245,730
6 :	245,647	10 :	245,721		245,697	27 :	245,685		245,718	44 :	245,680
	245,662	12 :	245,676		245,698	29 :	245,681	39 :	245,664	48 :	245,669
	245,670		245,679	20 :	245,646	32 :	245,648		245,665		245,673
	245,682	13 :	245,715		245,714		245,717		245,671		245,674
	245,683	16 :	245,690		245,720	36 :	245,651		245,672		245,688
	245,689	17 :	245,657		245,729		245,667		245,716		
	245,700		245,658	24 :	245,723		245,668		245,722	51 :	245,653
	245,706		245,659	25 :	245,678		245,693	40 :	245,728	55 :	245,650
	245,712		245,660		245,727		245,694	41 :	245,695		245,652

PLANT PATENTS

8 :	4,098	4,099	4,100	12 :	4,097		

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[Notice of Dec. 16, 1969, 869 O.G. 6877]

1 :	T962,001 T962,003	10 :	T962,002	T962,009	42 :	T962,005	47 :	T962,006	48 :	T962,011

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